Telephony.

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Unfair Competition in Michigan.

In all the federal litigation and congressional investigations concerning monopolies and corporate evils, great emphasis has been laid upon unfair competition. When great industrial combines have been called to account for crushing their business rivals, as a preliminary to robbing the public, it has usually followed the discovery that "big business" had put over its scheme by underselling its competitors in certain districts and making up the loss in other localities where the rivalry for trade was not so pressing.

An instance of this sort of warfare in the telephone business is found in an article on another page of this issue of TELEPHONY concerning the situation in Michigan. It seems that Railroad Commissioner Lawton T. Hemans, who is studying the telephone situation in that state, has gathered considerable data about conditions in Michigan with a view of laying it before the federal authorities. Even the meager outline found in this account is of interest. Among other things noted by Commissioner Hemans is the fact that the Bell interests in Michigan have reduced their rates in cities where the Independents are giving them a hard battle for patronage, far below the price fixed for similar service in cities where competition is less keen. For instance, the Bell rate in Grand Rapids, which has a population of about 115,000, is but $18, while in Kalamazoo, with a population of 40,000, it is $24 a year.

The reason for this is that in Grand Rapids the Citizens Telephone Co. (Independent) has the Bell so far outnumbered in point of subscribers that the later has to maintain a cut rate to hold any business at all. The same condition applies in many other places throughout the country, no doubt, the Bell underselling in one section in an endeavor to meet Independent competition, and in other sections charging a high enough rate to make up the difference.

These are precisely the same tactics that have brought other corporations into disrepute with the government in its anti-trust campaign. It is unfair competition that should not be allowed under the American plan of a square deal for all. To revert to the rates quoted above, somebody is getting the worst of the bargain. Either the telephone users in Kalamazoo are being imposed upon by a $24 rate, or else the Bell is entitled to a higher rate in Grand Rapids.

It is such instances as this that show the need of equitable regulation, and should furnish the authorities with plenty of food for thought.

Another Washington Report.

So far as the country at large knows, telephone matters are playing second fiddle—or is it twenty-second violin?—to the tariff question in Washington. The Wilson administration has been in power over four months now, but little or no definite information has been given out as to what disposition is being made of the telephone and telegraph problem left as a legacy by the preceding regime. Perhaps the time has been too short, considering the other huge tasks awaiting governmental action.

Last Monday's Associated Press dispatches from the capital contained the following announcement: "Suit to dissolve an immense merger between telephone companies soon will be filed by the government, according to present plans at the Department of Justice. A hunt for evidence has developed sufficiently, it is believed, to warrant the suit being filed. The alleged merger of companies took place in the far West, Bell interests in California, Oregon, Washington, Idaho, Utah, Montana, and Colorado being involved. The prospective suit has no relation to the study of the telephone situation being prosecuted by the Interstate Commerce Commission."

Meanwhile, it is to be surmised, the "study of the telephone situation by the Interstate Commerce Commission" is going on. Apparently it is what is known as a "still hunt," for no overt act has come from the commission that has reached the columns of the press. Doubtless the federal authorities desire to be sure they are right before they go ahead, which, of course, is recognized as a safe rule. The fact remains, however, that telephone men generally are more anxious to hear telephone news from Washington than bits of gossip about President. Wilson's golf game or Secretary Bryan's predilection for grape juice and white radishes. Maybe the more important developments will come after the heated term.

The Man You Can't Defeat

By HERBERT KAUFMAN

He isn't afraid of Failure and so, after awhile, Failure becomes afraid of him. When all's said and done, Failure is like every bully and turns tail at the first hint of a whole-hearted, fearless defense.

What if he does stumble? Granted that he goes down in defeat time and time again, just watch him fumbling, crawling, husbanding his strength bit by bit, gripping fast with his last shred of grit and his last flash of wit—never despairing—watching and waiting until he sees the chance. And then zip! Before you realize it, he is on his feet again and up against the wall, ready to take on any comer.

He keeps learning what not to do until he has narrowed down the field of mistakes and errors, and, by the sheer experience of elimination, he knows at last the few sane, safe principles of success.

The size of a task never appalls him. His courage is great enough to lift him shoulder to shoulder with any emprise to which he aspires; his resolution is the most terrific ram that ever battered the walls of circumstance.

Errors of judgment and his over-zeal repeatedly hurl him to earth. But while he lies on his back, he doesn't waste time wailing because of his failing. He doesn't rehash the past and moan and groan over what is gone and what can't be helped. He takes count of his assets and figures out how he can return to the game.

He doesn't mind the broken bones—they'll knit; or the bruises—they'll heal; or the sprains—time will take care of all of them. So long as his spirit isn't fractured and his resolution isn't fractured and his determination isn't splintered, he's not shattered, but only battered.

The mere loss of goods is just a loss of time. If he hasn't lost his manhood and his memory, he can duplicate whatever he possessed, and re-attain whatever he dropped.

You can "break" him, but you can't break his backbone. You can bind his activities, but you can't tie down his spirit. You can handicap him. But so long as he doesn't handicap himself, he'll win out against you as surely as day must follow night.

He puts his own judgment in the scales and the prejudices of the whole universe won't outweigh it. While there's breath in his body, and hope in his breast, and nerve in his meat, he's ready and eager to pit his ambition against all humanity.

Don't waste the time to laugh at him; to shrug at him; or to strike at him. The joke is bound to be on you in the end. He's padded all over with self-assurance. A sneer can't get through his vitals. Disbelief and incredulity rattle against his sheath of confidence like dry peas upon a stone wall.

Whenever you try to hold him back, you simply turn him into a bow. You bend him into greater power, and when you let go you have loaned him the strength to hurl his shaft of determination twice as far.

He's a human spring! The greater the pressure you put upon him, the further he'll rebound.

Opposition is his whetstone. It simply puts a deeper edge upon his keenness.

Every unfair dig that he receives, is a spur-tear. It doesn't stop him, but sends him leaping ahead. It rouses his lazing, lurking amperes and kilowatts of force. It calls upon his reserve of energy and sets it surging and singing through his being, doubling his horsepower, intensifying his voltage, until he breaks every band and bond of opposition.

Don't measure him by his years! Courage never rusts with time.

He'll break new ground for himself up to the hour that you break ground for him. You can't tell how he'll finish, until his finish.

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Manufacture and Use of Wire for the Telephone Industry

Practical, Non-Technical Description of Processes Involved in Conversion of Iron Ore into Wire—Story of Iron Wire from Mine to Warehouse Told by Illustrations—Paper Presented at Annual Convention National Independent Telephone Association

By H. S. Durant, *American Steel & Wire Co.*

The subject of the manufacture and use of wire for the telephone industry is too wide in its scope to be discussed in all its details in one paper. However, as the wire itself, rather than the jacket by which it is surrounded for insulating purposes, is the essential and vital feature in the great structures which have been created for the harnessing of electricity and the transmission of intelligence, we may confine ourselves to the processes involved in the conversion of wire from the raw ore without neglecting anything more pertinent to the general subject or more interesting and absorbing in detail.

Fig. 1. Mine Shaft.

Fig. 2. Using the Steam Shovel in an Open Mine.

Fig. 3. Open Mine Showing Extent of Workings.

The illustrations presented cover the history of iron and steel wire from the mine to the warehouse. Beginning with the ingot stage, as regards copper, and the billet stage, as regards iron, the treatment of copper and iron is practically the same. The refining processes, of course, are altogether different. Inasmuch as the mining and refining of copper are entirely disassociated from the wire industry proper we shall not extend beyond our province and try to explain the intricate and various processes involved.

Just a word in regard to these two metals, copper and iron, which are used almost to the exclusion of all others for the conduction of electrical currents. Copper is by far the most important material for conductors both on account of its high conductivity and on account of its physical characteristics. Standing, as it does, next to silver as the best conductor occurring in such quantities as to make the supply adequate to the demand, and necessitating a fairly inexpensive though complex process for recovery, it is only natural that copper should have met with the greatest favor and that the increase in its use should have been phenomenal. In fact, the wonderful growth and development in electrical apparatus have been made possible chiefly by the fact that we have two such metals as copper and iron, which possess the necessary conductivities for electricity and mag-

netism. Pure copper possesses many physical properties of great engineering value, in addition to that of its righ conductivity. It has, to a very high degree, the qualities of malleability and ductility which make it an ideal metal for wire drawing. Its strength and hardness are greater than those of any other metal except iron and steel. It has the power of resisting oxidation; it takes a fine polish; is easily worked and can be forged more readily than iron.

Fig. 5. Loading Docks, Showing Cars on Top.

Without iron wire, however, the developments of telephone and telegraph systems could never have attained the proportions which confront us to-day—this because of its cheapness. The first telegraph line erected in the United States in the year 1844 for conducting the Morse experiments was of copper. Later on, owing to the high cost of copper, Swedish iron wire was used, and during all the earlier developments of telegraph connections in this country the lines were all of iron. As an additional measure of protection and to insure longer life the iron wire was galvanized. When, in 1877, the telephone had been perfected and adopted, both galvanized iron and steel wire were used for telephone lines. They served admirably for short distances and are still used very extensively throughout the country both for telegraph and telephone services.

We cannot pass from this general treatment of the subject of conductors without a word regarding one of the recent developments of the wire industry. For nearly a century attempts have been made to manufacture a wire that should combine the good qualities of copper—high conductivity and non-corrosiveness—with the strength of steel. Various methods have been tried such as wrapping steel wire with copper tape, electroplating steel wire with copper and slipping copper tubes over steel billets and then rolling down to wire rods. All these methods failed, for no weld was obtained between the copper and the steel and the copper not only peeled off, but the core was eaten up by electrolytic action.

Not many years ago John F. Mannot obtained patent rights on a process which differed from all previous attempts, in that they covered the formation of a layer of copper-iron alloy on a steel billet. This method results in a perfect weld and all separation between the two metals and all electrolytic action is prevented. Briefly defined, copper clad steel wire is a wire with a steel core and a copper covering, or armor, welded on. The weld is made by first fusing a coating of copper-iron alloys on the surface of a steel billet and then casting molten copper about the steel. The copper welds to the steel through the intervening layer of copper-iron alloy. The billet is then rolled down to a rod and drawn to any gauge of wire desired, the proportion of copper to steel remaining constant throughout. Copper clad steel wire is made in three distinct grades, i. e.: 30 per cent, 40 per cent and 47 per cent conductivity, that is to say, as compared with the conductivity of a full copper wire of the same diameter.

Copper clad steel wire is being used by telephone companies for house connections, city, suburban and rural lines, and for long distance lines in many cases. No. 17 B. & S. gauge copper clad wire of 30 per cent conductivity, insulated with rubber to a diameter of 7/64 inches and braided, is very extensively used for drop wire and has everything to recommend it for this purpose, especially on account of its tensile strength and because the conductivity is sufficiently high for the purpose.

Fig. 4. Railroad Tracks in Open Mine.

Of the accompanying illustrations showing the transporting of the ore to the blast furnaces and the manufacturing of that ore into the finished wire products, Fig. 1 shows the over-

head works of a shaft mine. The shaft runs down into the earth the same as in a coal mine and the ore is hauled up in skips to the top, where it is dumped into a chute and finds its way into the car beneath.

Very often the ore is very close to the surface and it is only necessary to skim off the top in order to expose the ore itself. In Fig. 2 is shown the first operation on such a mine. When this condition prevails the ore can be mined by steam shovels. Naturally, a mine of this kind is exceedingly valuable because of the ease and cheapness with which the ore can be gotten out. In Fig. 3 is given another view of an open mine. It shows the work farther progressed and an idea of the extent of the workings is had by a glimpse into the background of the picture. As the work progresses the railroad tracks in the mine shown in Fig. 4 are moved to bring the steam shovels nearer to the bank of ore which recedes rapidly under their attack.

Fig. 6. View of St. Mary's River at Night.

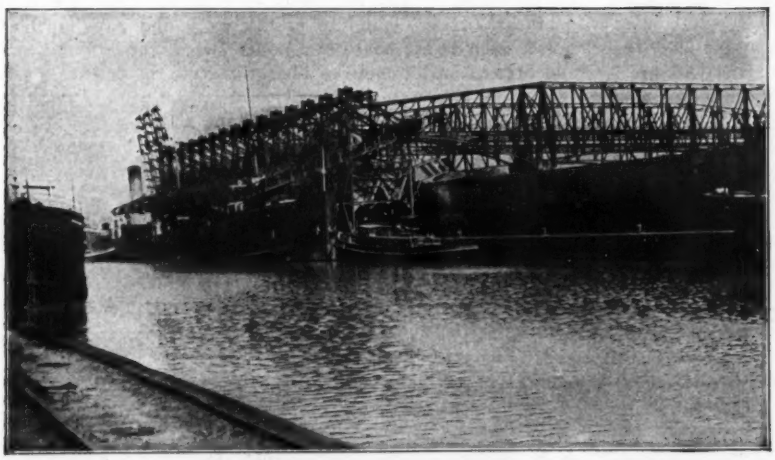


Fig. 7. View of Ore Unloading Process Showing Operation of Clam Shell Buckets.

The ores from various mines differ considerably in character and analysis. These different ores, therefore, are kept separate until they arrive at the blast furnace where they can be properly mixed for the manufacture of the character of steel required. At a junction point of the railroads running to the various mines there is usually seen a number of switch tracks filled with cars. The cars from the several mines are assembled at this place, each mine having its own switch track, and when enough ore of a certain kind is assembled it is hauled down to the docks for loading into boats.

The ore is not reduced to pig iron in the region of the mine for the reason that it is necessary to have coal, coke and limestone for the reduction of the ore. As these essentials are not found in the northern country, where most of the ore comes from, the ore is transported to the coal and limestone regions.

The docks to which ore is hauled for loading into boats are perhaps 75 to 80 feet above the water. The train loads of ore are run out on the top of these docks and the ore dumped into pockets, passing then through chutes into the hold of the vessel. One view of these ore loading docks is given in Fig. 5, showing trains of cars on the top of the dock at the right. The chutes, it will be noted, are in an upright position, so held until the boat comes alongside, when they are lowered into the hatchways of the boat. The flow of ore from the chutes is controlled by men standing on the platform above. The hatchways of a modern ore carrying vessel are placed as closely together as possible, to facilitate loading and unloading.

The ore is unloaded from the boats by means of hoists lowered over the boat, as shown in Fig. 7. The ore is hauled out of the boats by what are called clam shell buckets, which run back upon the runway

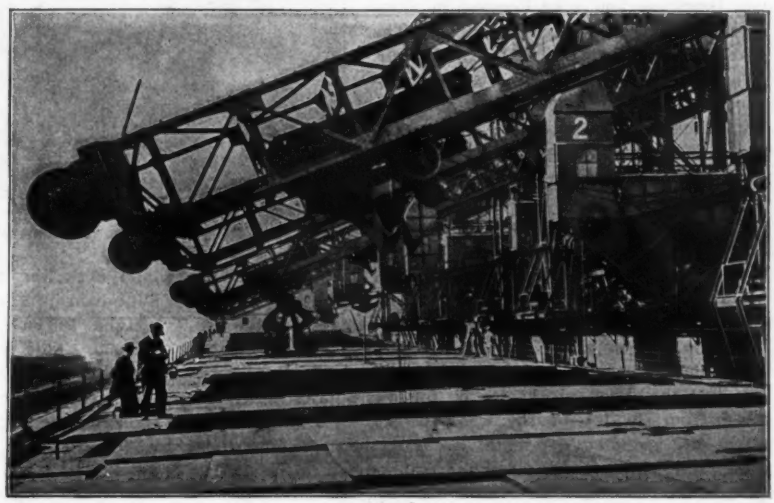


Fig. 8. Clam Shell Bucket from Boat's Hatchway.

and dump the ore into the cars to be hauled either to a distant blast furnace or carried over to the ore piles beyond, if it is to be smelted at this point. Fig. 8 affords a closer view of the unloading operation. One of the clam shell buckets may be seen just coming out of one of the hatchways. The operation of these buckets is controlled by a man in the small house to be seen in the picture.

Fig. 9. Vast Piles of Iron Ore.

A view of the vast piles of ore dumped near the blast furnace and waiting to be smelted is seen in Fig. 9. This ore is distributed by the enormous traveling bridge which runs upon the railroad tracks shown.

Up to this point, as previously stated, the ores have been kept separate and now they are collected by scale cars which run along the ore bins and takes such quantities of this or that grade of ore as may be desired to make the necessary mixture.

A general view of the blast furnace is shown in Fig. 10. In principle the blast furnace is nothing more nor less than a huge stove standing 75 or 100 feet high. Its operation is similar to ordinary base burners. The material with which it is to be charged is hauled up in barrows or skips on the elevator runway which may be seen on the other side of the blast furnace, and which will be more clearly shown on the next picture. A charge consists of iron ore, limestone and coke dumped in alternately so as to be properly mixed. The coke burns and, under the blast of hot air, which is introduced near the bottom, produces a very intense heat, which fuses the ore, causing the metallic iron to separate, and as it trickles down through the mass is collected at the bottom. The separation of the iron from the dirt and earthy impurities is made possible by the fact that the latter combine with the limestone to form a fluid slag lighter than the molten iron which consequently floats on the top of the bath and can be skimmed off. The other domes to be seen in the picture are stoves for the preheating of the air blast. An idea of rigid economies practiced in the manufacture of steel and iron may be had from the fact that the stoves are heated by the waste gases which are taken from the top of the blast furnace. On the railroad tracks are mounted hot metal ladles or kettles. Into these ladles the heated metal is run and transported in the molten state to the Bessemer converter or the open hearth furnace.

(To be continued.)

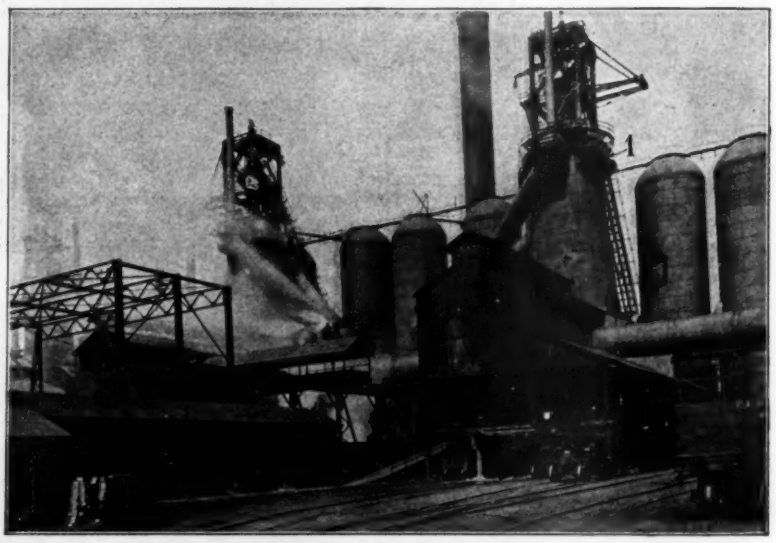


Fig. 10. General View of Blast Furnace.

Telephony and the Ear Health.

An interesting statement was made by Dr. Clarence J. Blake at the Harvard Medical School recently, when he gave a lecture on "The Effect of Occupation on the Hearing Power." "Of all the trades which would seem likely to cause deafness," the lecturer said, "the occupation of the telephone girl suggests the greatest danger, but in reality it never causes any ear difficulties. Although telephone girls are obliged to sit for hours at a time, with a receiver at their ear, the hearing is not impaired, but instead it is energized and quickened."

Among the things that he classified as conductive to deafness, were stone cutting, all sorts of dust-creating work, coal and iron mining, glass blowing and foundry work. Particularly dangerous to the sensitive parts of the ear is the dust which arises from the grinding of mother of pearl, bone, horn and the constant handling of tobacco.

"The telephone is not dangerous to the hearing, while the playing of wind instruments causes utter deafness," says the professor. "The breathing of poisonous gases, causes deafness. Heavy gun fire in the army and navy, violent noises such as are heard in a boiler factory, or by engineers and firemen on locomotives affect the drum of the ear."

The Longest Telephone Cable.

A 35-mile cable for telephonic connections between Vancouver and Vancouver Island has been received from England, according to a report from Vice-Consul General G. C. Woodward, Vancouver, Canada. It cost over $100,000, weighs 560,000 pounds, and the expense of laying was $20,000. This is said to be the longest telephone cable in the world, and is laid at a depth heretofore not attempted, much of the line going 200 fathoms deep in the Gulf of Georgia, the depth at one place being 1,356 feet. By the middle of July a cable will be stretched across Saanich Inlet, which will bring Victoria into much better connection with Vancouver by means of the cable that has just been laid.

The Invisible Government

A July Incident—The Wadesboro Variety

By J. C. Kelsey

. A man drove quietly down the road, thinking of his own affairs, and suspecting no danger. As he passed, another man stepped stealthily out into the open, took careful aim, and fired both barrels of a gun loaded with buckshot into the back of the conveyance.

The second man was a bushwhacker. This type of cowardice was quite common 50 years ago.

Many men, women and children went to death at the hands of an invisible enemy.

A small dealer goes quietly about his business. After a time, he begins to lose customers, the bank begins to question his credit, and his deliveries of goods are ruinously delayed. He has been shot in the back.

The commercial bushwhacker has been at work. He has fired not only two barrels, but many more. For bushwhackers' guns had but two barrels, while trust bushwhackers have many new and deadly barrels.

No longer does the family lie dead in the buggy, shot from commercial ambush.

The man becomes a clerk, gives up his pleasant home, and vainly strives to maintain his self respect, as well as to keep the wolf from the door.

He has been ruined by an invisible enemy.

The young man is sent to congress. He goes on definite pledges and faithfully supports his people.

The next election takes place, and another man is elected.

The invisible government has decided to defeat this man not friendly to their greedy interest. They send money into the district and flood it with misrepresentation.

A promising political career has been ruined. He has been killed politically by a bunch of commercial bushwhackers.

I have often said in these columns that politics never became rotten until a bunch of respectable business men got into it.

That there is an invisible government has been shown by the Chicago Tribune. They have 20,000 letters, telegrams, and receipts, showing how the National Association of Manufacturers controlled distinguished senators and congressmen, and how they showered money in districts to defeat unfavorable men.

How they spent great sums to discredit labor leaders, elect friendly congressmen, influence labor arbitrators, govern legislators, and frame beneficial tariffs, etc.

Invisible government! The expression has a sinister sound.

It smacks of murder, intrigue, robbery, and every form of deviltry. One can almost see bushwackers, footpads, and forgers all locked together in loving embrace.

Nothing too vicious would appall this bunch. It almost makes you afraid to pass an alley or walk upon a quiet street.

An invisible power is watching you. Nothing can be more horrible.

If it disapproves of you, then you die or go to ruin.

I saw a moving picture not long ago which illustrated the horror of an invisible enemy.

A very brave man was given a test by his friends, to settle a wager. A note was left on his table saying he would die at midnight.

As the clock moved toward that hour, the sufferings of a normally brave man were awful. And the suffering of the audience was every bit as acute.

Just as the midnight hour struck, a messenger brought a note asking him if he had stood the test. Of course, he had not, and I would not have, nor would you.

The natural horror of an invisible enemy simply made him a cringing coward.

That is why the idea of an invisible government can give us a creepy feeling. It is the possibilities of harm that worry, not the things that are actually done.

In the telephone business, there seems to be something of invisible government.

Independent telephone manufacturers have been given definite lengths of time to live ever since I have been in the business.

Usually, we are to die at midnight three years from hence, but somehow the promised death does not come.

The invisible government must become tender-hearted at the last moment.

We have heard a great deal about peace in the telephone business, and there possibly is just such peace as we have in the Philippines.

There is still bushwhacking and shooting into the backs of men and corporations.

I recently received a letter from the salesman of an Independent telephone manufacturer. By hard work he had received an order for a switchboard amounting to $2,750. But thereby hangs a tale.

The Wadesboro company is an Independent telephone company in North Carolina, and it won its right to exist in a hard fight.

The Bell company withdrew from the field and was glad to give toll line service to this victorious concern.

You know how hard the Bell company has struggled for connections of this kind. It is proud of its success in getting these contracts. And it makes loud boasts of its 2,500,000 Independent telephone connections.

As I said before, the contract was awarded to the Independent telephone manufacturer. The Bell factory with its millions had lost the deal. But it had not given up hope.

But let me give you the letter.

"After the Wadesboro contract had been awarded, the Western Electric representatives went to the members of the purchasing committee and offered switchboard with telephones to be delivered and installed at a reduction of several hundred dollars below their original price.

Two members of the purchasing committee told them the deal was closed, but the third member, a wholesale grocer, went to the president of the company with the new proposition.

The president got the directors together and they decided to cancel the order and open the deal again."

Now the subject matter of the letter is important to telephone manufacturers who advertise in TELEPHONY—and it should be of interest to you who operate telephone systems, because of the methods practiced upon these Southern telephone men.

Methods which have been abandoned so long in the Northern and Central states.

"During this time, the Southern Bell influence was being brought to bear, and it actually frightened the president and two directors to such an extent that they began to work feverishly for the Bell factory.

Telegrams, letter, and telephone messages were received to the effect that the purchase of any equipment other than Western Electric would endanger the pleasant relations now existing between the Bell and Wadesboro companies."

It seems incredible at this day that a group of business men should fall for such a silly story.

This gag is older than the original mother-in-law joke.

"The influence was so strong that one member of the purchasing committee stated before the directors that it was his conviction that the purchase of an Independent equipment would depreciate the stock of the Wadesboro company by 50 per cent., and that he would personally vote for Western Electric devices, if it cost $500 more."

If this fellow ever comes to Chicago, I hope no one will sell him Grant's monument for their public square. The Bell salesman who perpetrated this joke upon this group of innocent men should be ashamed of himself.

It is a safe bet that he would never try it in localities where the operators know better.

We once used to hear that the Bell company would pay a higher price for an Independent plant if it bought Western Electric apparatus, but even this shop-worn jest has been exploded.

No one has ever yet seen any of these weird promises put in writing.

"Mr. X. also stated before the directors that he felt certain that the purchase of Independent equipment would cause the Bell company to withdraw its support and probably its toll lines."

It is hard for me to believe that Pickett's charge at Gettysburg could be made by men as fearful as the Wadesboro directors.

Where is the much vaunted courage of the Sunny South? Can it be that Wadesboro is really a Yankee community?

"Mr. X. further stated that with an acknowledged superiority of Independent equipment, he would still be willing to pay the Western Electric Co. $1,000 more to insure a continuance of the pleasant relations with the Bell company."

You must hand it to the Bell bunch who so terrified these Independents.

"If ever the Bell company forced a connecting company to purchase Western Electric apparatus, they did it here.

One of the directors after the deal said neither the Western Electric Co. nor its salesman claim to have sold this deal. The Bell company did it.

You cannot realize the tremendous pressure brought to bear in this case, and I sincerely hope something can be done to remove this influence on future deals.

The Bell company has the majority of the connecting companies scared to death. If we can do some publicity work or find some way of putting backbone in these people, I will be pleased."

I presume everything is fair in war—at least I have always heard this.

I did not realize that the Bell factory was so desperately anxious for switchboard orders.

So far I am unable to decide what the chief aim and ambition of the Bell company is. At times I believe in its sincerity—that its chief aim is service pro bono publico.

Sometimes I am forced to believe that the chief aim of this billion-dollar concern, so rich in possibilities, is to sell a small switchboard.

I believe there is more rejoicing over the sale of a switchboard than there is over the successful flotation of securities.

The Wadesboro contract amounted to $2,750. It apparently occupied the attention of the Bell company for two weeks.

How much did this contract really cost the Bell company?

Let us get down to common sense. Why should the machinery of the Southern Bell company be stopped in order to sell a $2,750 switchboard for another company?

It certainly is a ridiculous situation, because the Bell company expended more time and energy, which is money these days, than the Western Electric Co. did.

The Wadesboro Telephone Co. was influenced by the bugaboo of an invisible government.

These people were literally frightened into believing the fairy story that their long distance service would be lost, and their stock value reduced.

Gold brick men would have easy sailing in Wadesboro.

The Southern Bell company has recently issued an expensive pamphlet, entitled: "The Advantage to Local Telephone Companies of Connection with the Universal Bell System."

"The purpose of this pamphlet is to interest local telephone companies that are not now connected with the Bell system.

"And to show the advantages and satisfaction now enjoyed by local Independent companies that have made connecting contracts."

Nowhere in this pamphlet do I find a word about Western Electric apparatus.

Nowhere a threat that a failure to purchase Western Electric goods would result in a suddenly broken contract, and a 50 per cent. depreciation in stock price. Not one word of intimidation,—merely a pleasing promise of advantage and satisfaction.

One would think that a company, 30 years of age, with a capital stock of $15,000,000 and a bond issue of $15,000,000 would be able to do something for itself, and not depend upon operating companies to enforce the sale of its products. Such gigantic helplessness has no parallel.

I am surprised that Wadesboro fell for this tangled tale. Where is its daily paper?

If they read it, they could learn that intimidation has been getting hard knocks lately.

They could also learn that 50 years ago gallant men from North Carolina followed Pickett clear across the wheatfield to the very stones of the bloody angle.

The worst part of it, the buying commitee were business men—cold-footed business men, living in fear of goblins, believing still in fairies—believing that the affection of the Southern Bell would grow cold if they did not buy a Western Electric switchboard.

It is a matter of fact that the Western Electric sales campaign has done more to harm the Bell operating companies, and cause them useless expense, than any other influence. Any honest Bell general manager will admit it.

I have seen and heard much about the Bell companies' desire for peace.

I know how complacent most of their people are, lulled

to sleep so easily, believing in the ultimate death of every competitor.

This is a poor time to sleep. It is a poor time to use a big stick on poor defenseless and ignorant buyers.

I don't believe the Southern Bell officials had any part in this intimidation deal. I believe they know better than to waste time on a $2,750 switchboard.

I believe they will quickly cut off future wastes of telephone lines, telegraph and railroad fares when they fully realize how ridiculous it is to use a $50,000,000 machine over two weeks in the sale of a small switchboard by some one else.

Here is the point:

We believe in the survival of the fittest.

If a great big company cannot sell a $2,750 switchboard on merit alone, some one ought to be getting alarmed over its fitness.

If the Bell factory is merely the playground or laboratory for the Bell, a sort of an irresponsible child, it will pay them to awaken from their sleep and take the child indoors. Some one will steal him.

It is not pleasant to go into these things, but we have heard so many promises regarding the elimination of abuses, that I would like to see more actual deeds and hear less talk. On the whole, the affair is ridiculous from all sides.

MORAL: Missionaries can still do effective work in America.

Placing the Telephone Wires Underground in a Small City

A Supplementary Article to That Published in May 17 Issue Describing Cable Installation of the Painesville, Ohio, Telephone Co.—Effects of Frost, Electrolysis and Wide Temperature Variations—The Location of Trouble and Other Questions Regarding Installation

By C. M. Grauel

Since the publication of the article in TELEPHONY, issue of May 17, on the installation of underground cable at Painesville, Ohio, so many inquiries as to the various features have been received, that the writer has been forced to turn them over to the company's engineer, Allen C. Morse, of Cleveland, for reply. By answering some of the questions through TELEPHONY a great deal of work may be saved and also some objections set at rest as to the system used.

For the benefit of those who did not read the former article, I will give briefly a description and the results of our installation and answer some of the inquiries at the end.

POST FIGURES OF THE NEW METHOD.

The Painesville Telephone Co. last fall installed over 19,000 feet of cable along leads that required rebuilding and increase in capacity, by digging a trench in the tree lawn or parking, not more than two feet in depth. The cable was laid in the bottom of the trench, covered with tar paper and three inches of concrete, and then the trench was refilled.

This was done at a cost of less than 9 cents per foot, not including the cost of the cable, but including all other material and labor. This cost, compared with what it would have cost to have rebuilt the pole lines and placed the cable on them, showed a saving of about 12 cents per foot in first cost, a depreciation saving of 1 1/6 cents per foot per year, a maintenance saving of ½ cent per foot per year, and a saving in interest on the reduction in first cost of ¾ cent per foot per year, making a total annual saving of about $550 per year.

Our experience has justified the departure from established methods, and with the 21,000 feet installed this spring we believe we have a permanent and lasting plant and one not subject to many of the troubles experienced with an aerial plant. We anticipate the most trouble will be from diggers, so we have furnished the water, light and gas companies, also all contractors, with blue prints showing the locations, and think that with the protective covering of concrete we have infinitely less to fear than if we had put it up aerially.

The majority of the letters have brought up the question of frost, or freezing of the ground. It is, of course, well known that the freezing of poorly drained lateral pipes has crushed the cable contained and caused many cases of trouble. We were aware of this and used a galvanized sheet iron protector on the poles, but did not confine the cable in a way that water could stand and freeze and exert any pressure upon it. The cable itself would not be affected by freezing and, when buried in the earth, could not be injured by the soil freezing around it, if unconfined in a rigid pipe.

The heaving of the soil from frost is pretty uniform and never exerts itself in distinct lines of cleavage, or in a manner such as to subject the cable to a shearing stress. We did not have any trouble from frost last winter, although the ground was frozen down below our cable. We are satisfied, from the experience of the companies near here that have had cable installed without ducts for nine or ten years, that there is nothing to fear from frost where the cable is not confined in rigid pipe. As an illustration of this, the Mentor Telephone Co. has had a cable, 1,100 feet long, buried in an unpaved roadway without protection for six years and only 12 to 15 inches deep. The soil is gravelly and generally full of moisture.

This cable was recently taken up and relaid in the parking at the side of the road to avoid a pavement to be laid, and there was not the slightest sign of damage from any cause. I do not see why it will not last indefinitely.

Another question generally asked is in regard to electrolysis. All underground plants in the vicinity of trolleys or lighting plants are subject to electrolytic action. All that anyone can do is to test frequently and bond wherever necessary. I believe that cable in contact with the earth its entire length is more favorably placed than in a subway where moisture collects in spots and localizes the effect. If one is away from these sources of earth currents, they have nothing to fear from electrolysis.

The question of location of trouble and repairing the cable is one about which many asked. In the first place, a description of the usual way that trouble is located in an aerial plant, will show why the underground system is better from this point of view.

On a plant that has no Wheatstone bridge for the location of trouble, in case trouble occurs, some idea is usually possible of its general location and a man is sent to ride the cable and look for it. Many cases of trouble in aerial cable are not visible to the eye, and after riding the cable the man must cut the sheath and test. He will then move toward the trouble and cut again, and continue to cut until he strikes the trouble. Every cut means swinging a platform and putting on a sleeve. I have seen a number of cases, each of which have cost enough

to have bought a bridge. The practical result of this kind of work is to reduce the cable to junk in a few years.

The use of a Wheatstone bridge, even on long lines, gives a location which will show close to the trouble and an accurate location can be made from the nearest point where the pair or pairs in trouble appear outside. This should always be done before cutting into a cable, and if the cable must be opened, the nearest sleeve should be blown.

With cable laid in the manner ours is, trouble can be located with even more accuracy and only a comparatively small length uncovered. The concrete breaks out in chunks and can be laid back after the repairs are made, and covered with earth again as it was before. One reason trouble can be located more accurately on our cable is due to the fact that in case of any fault or accident happening to the sheath, moisture will penetrate more rapidly as a rule. By testing on its first appearance, while a good wire is available, its location can be accurately determined. It is certain that if the fault were due to external causes, such as diggers, one can locate the exact spot by an inspection of the surface of the ground. Also, as we did not cover our splices with concrete, but used a plank as protection, it is easier to uncover one than to swing a platform.

Effect of Temperature Variations.

Aerial cable in the northern states is often subject to extremes of temperature, from 40 degrees below to 120 above, or 160 degrees. The very considerable air space in the cable will form quite appreciable pressures. Often breaks in the sheath may exist a long time before enough moisture gets in to cause trouble, but, like all low insulation, it will cause noisy lines and cross talk. The difference in temperature between day and night, or even at shorter periods, causes the expulsion and influx of air as the temperature rises and falls. Every inrush of air carries with it moisture, which is retained by the paper insulation, and continuation of the process will in time introduce enough moisture to produce a case of trouble. Trouble so produced often extends over quite a length, necessitating cutting in a new place, which, if necessary to continue service during the work, requires the services of two splicers.

With our cable no such action can occur, as the temperature will never vary but a few degrees in a short period, and any break in the sheath, except in the dryest of soils, will show up in a very short time and will be quite positive. Another thing, no trouble will show up while the ground is frozen to the depth of the cable, as ice is a non-conductor and the moisture present would be frozen.

One objection was that with this system there was no visible plant, therefore it would be impossible to appraise it. How about water and gas companies and, in fact, all subways for power and telephone plants? They are the most valuable parts of the plants and no one making an appraisal questions their existence, so long as outlets appear at various points.

Although this system of cable construction is adaptable to the large as well as the small company, let us look in our mind at the average small telephone company. They generally have a large lead of poles through the main street, loaded down and poorly guyed; slack wire in a rusted condition, giving the poorest kind of service generally, and no service after a lightning, wind or sleet storm. Now imagine such a lead replaced with this kind of cable construction; with double the capacity; less than half the poles, and no bare wire, a construction that will give service through lightning, wind and sleet storms, at less than half the cost of duplicating the old construction. Or consider the side leads, with five or six pair of wires in poor shape generally. Figure it out for yourself, with the price of 15-pair cable at 8 cents per foot or less and the cost of placing it underground as much more. How much would it cost you to rebuild your old lead and put even the present capacity on it, let alone increasing it?

Report of Canadian Municipal Telephone Companies.

Some interesting figures have been compiled showing the financial results of the municipally operated telephone systems at Fort William and Port Arthur, Canada. In Fort William, Ontario, where the population is 21,000, there are 400 commercial telephones at a rental of $36 per annum and 1,600 residential telephones at $18 per annum. Extension telephones are charged for in addition at the rate of $6 per annum and there are a number of private branch exchanges installed. The central office of this system is now being increased from 2,000 to 3,000 lines and the outside plant to 2,700 lines. Kellogg lamp signal, central energy multiple switchboard equipment is being used.

The total account debentures issued amount to $200,000. These draw 4½ per cent. interest and 4 per cent. is also set aside for the sinking fund reserve, the amount of which reserve is $48,000. The sinking fund takes the place of reserve for depreciation, as the policy is to operate the plant on a purely maintenance basis, so as not to tax the present generation for the benefit of the future generation, but also to make adequate charges at the present time, so that the future generation will not be obligated for any amount for which they cannot show an equivalent in tangible assets.

The financial results in the following table are for the year ending December 31, 1912:

Operating Revenue.		
Earnings from commercial and municipal service	$45,390.24	
Less rebates	705.51	
Total revenue		$44,684.73
Operating Expenditure.		
Controllable.		
Operating expenditure		$20,713.85
Long distance	$ 119.22	
Inspection	56.12	
Operators	10,502.70	
Office supplies	34.13	
Switchboard	2,345.05	
Installation	1,397.86	
Administration	335.07	
Legal	2.00	
Buildings	251.93	
Watchman	150.70	
Trouble work	1,372.50	
Stores	99.43	
Accounting	395.69	
Office rent	248.96	
Line maintenance	2,472.40	
Stable	113.77	
River crossing	38.58	
Directories	575.44	
Gross gain on operation		$23,970.88
Uncontrollable.		
Bank interest	$ 417.04	
Debenture interest and sinking fund	19,074.90	$19,491.94
		$ 4,478.94
Less amount reserved for bad and doubtful debts		453.90
Net gain on operation for year 1912		$ 4,025.04

The Fort William system is under the immediate direction of A. L. Farquharson, manager of the telephone department of the city.

At Port Arthur, where the population is 16,500, there are 500 commercial telephones at $30 per annum and 1,920 residen-

tial telephones at $15 per annum. The charge for extension telephones is $6 per annum and there are a number of private branch exchange systems. A large part of the construction is underground. Aerial lines in many places are on joint poles with the municipal lighting system. The central office is now being increased from 2,100 to 3,750 lines, and outside construction to 3,000 lines. The system is using the International lamp signal, central energy multiple switchboard equipment. The average operating force is 33 operators with an average wage scale of $32.50 a month.

The debentures outstanding at present against capital account amount to $194,500, which is the net amount after it has been reduced 10 per cent. from operating revenue.

The following statement shows financial results for the year ending December 31, 1912:

Reserve for sinking fund (approximately, invested in other utilities)			$11,000.00
Revenue—			
March .....$ 9,286.40			
June 9,367.65			
September 9,752.25			
December 10,272.65			
		$38,678.95	
Expenditures—			
Maintenance .....$ 7,690.96			
Hymers line maintenance..... 119.20			
Operators' salaries 12,946.48			
Insurance 897.41			
Motor truck 136.66			
Storehouse expense 29.25			
Commission pay stations, etc.. 54.00			
Total operating $21,873.96			
Salaries, city offices.....$ 2,554.42			
Rent, city offices..... 975.00			
Total		$25,403.38	
Gross gains from operating		$13,275.57	
Fixed charges—			
Debenture interest .....$ 7,039.44			
Annual installment on debenture (reducing capital cost) 5,149.10			
Sinking fund 1,843.60			
Total fixed charges $14,032.14			
Interest on current overdraft.. 1,478.00			
Total fixed charges and interest		$15,510.14	
Year's overcharge to operating		2,234.57	
Reserve for bad accounts.....		386.80	
Total year's average.....			2,621.37
Balance reserve for sinking fund			$ 8,378.63

In addition to the sinking fund reserve capital account has been reduced out of operating revenue to an amount over 10 per cent. of the investment.

The management of the Port Arthur telephone system is under the general direction of the Port Arthur Utilities Commission. W. P. Cooke is chairman of this commission as well as of the Port Arthur and Fort William Joint Utilities Commission. The Port Arthur system is under the immediate direction of Thomas Delbridge, superintendent of the telephone department, under J. J. Hackney, manager of utilities, and J. A. Oliver, mayor.

Macoupin County Telephone Co.'s New Plant.

The Macoupin County Telephone Co., of Carlinville, Ill., has practically completed the work of rebuilding its plant at Carlinville, and the company recently celebrated the event by a banquet given by the officers of the company to the members of the commercial club, members of the city council, board of education and local stockholders of the company. The banquet was served by the ladies of the Episcopal guild.

The toastmaster of the occasion was C. B. Cheadle, of Joliet, Ill., secretary of the company, while responses were made by C. T. Woodward, president of the commercial club, and Dr. Robert Hankins, mayor. Other speakers were A. G. Hawley, president of the company, A. H. Bell, president of the school board, A. M. Haubrich, sales manager of the Stromberg-Carlson Telephone Mfg. Co., Dr. Wm. M. Hudson, president of Blackburn College, E. S. Sterrett, vice-president of the company, B. M. Burk, president of the old telephone system and pioneer telephone man of Carlinville, and others.

On the next afternoon following the banquet there was begun a two days' reception for the general public, who were received in the new building of the company. The building is a two-story brick structure with many windows giving abundance of light and air. In honor of the guests the rooms were decorated with palms, ferns and bouquets.

The guests were received by Sercetary C. B. Cheadle, G. W. Pringle, local manager, and Mrs. C. T. Woodward, who acted as hostess of the occasion. Also receiving in the reception hall where the young ladies of the office force, who gave each guest a souvenir post card bearing an excellent picture of the building. The guests were also served an ice-cold fruit punch.

In an adjoining room were the long distance operators busily engaged in making toll connections for subscribers. The large office room, furnished with up-to-date equipment stood vacant of its usual occupants as no unnecessary work was carried on during the receiving hours.

In the fourth room on the main floor of the new building is located the desk of the wire chief, while up stairs in a large room are the local switch boards, attended by four operators. The manager's office is also located up stairs, as well as two pleasant rest rooms where the operators may spend their recreation time in resting or reading.

Collection Plan at Grand Rapids.

The Citizen's Telephone Co., of Grand Rapids, Mich., has adopted an arrangement whereby persons signing contracts for telephones agree to pay 50 cents additional in the case of residence telephones and 75 cents in the case of business telephones if their quarterly bills are not paid on or before the twentieth of the month in which they are due. The company already had a rule by which telephone bills were payable quarterly in advance. After the twentieth of the first month of the quarter the company adds the foregoing collection charge to the bills.

General Manager Tarte explains that he hopes the company will never be called upon to collect these penalties as they are simply intended to hurry collections and are really not penalties, but a charge to cover the extra collection cost incurred when subscribers do not pay promptly. Heretofore the only course has been to send collectors, argue and labor with delinquent subscribers and then threaten to remove the telephone, a course which was unsatisfactory.

Italian Telephone Girls Wed After Ban Is Removed.

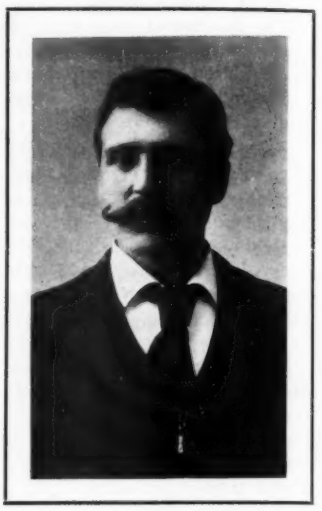
In a June issue of TELEPHONY, announcement was published of the removal of the ban against married women as telephone operators, by the postmaster general of Italy. A special cable dispatch from Rome states that the postmaster general is bewildered over the result of the recent privilege of marriage granted by him, 300 of the girls having promptly taken advantage of the permission granted and every couple having asked him to act as best man.

A Quartet of Men Prominent in the Telephone Field

CHARLES AUGUSTUS OTIS, president of the Cuyahoga Telephone Co., Cleveland, Ohio, was born at Cleveland in July, 1868. He was educated in the local schools and at Andover and Yale University. From 1891 to 1895 he engaged in the cattle business in the West, when he returned to Cleveland and with Addison H. Hough formed the brokerage firm of Otis-Hough Co., which engaged at first in the iron and steel agency business, but later confined its work to stock and bonds. Mr. Otis became president of Finance Publishing Co., member of the Cleveland and New York stock exchanges, a director of the United States Telephone Co. and the Cuyahoga Telephone Co., and a member of the advisory board of the Citizens' Savings & Trust Co., of Cleveland. His main hobby has been that of rearing cattle, horses and fancy pet stock at his big country place, Tannenbaum farm, near Willoughby, in Lake County, adjoining Cuyahoga County, N. Y. His present occupation is that of investment banker. Mr. Otis is a member of practically all of the Cleveland social clubs and of the University Club of New York City.

LOUIS ALFRED RUUD, traveling auditor of the Inter-State Independent Telephone & Telegraph Co., Aurora, Ill., was born in Chicago, Ill., in November, 1885, and was educated in the grammar and high schools of that city. He entered the service of the Chicago City Railway Co. in April, 1902, as clerk in the accounting department. He was promoted periodically until April, 1910, at which time he held the position of chief bookkeeper. He resigned from this position in April, 1911, to accept the position of auditor for the Central Ice Co. and the Fruit Growers' Refrigerating & Power Co., Anna, Ill. He resigned from this position in August, 1911, to become chief clerk to the general superintendent of the Chicago Railways Co., Chicago, Ill. He remained with this company until June 1, 1912, at which time there was a general revision of the operating department due to difficulties between the company and the labor unions. Mr. Ruud left the street railway field at that time and entered the service of the Inter-State Independent Telephone Co., of Aurora, Ill., in July, 1912, as traveling auditor, which position he is now holding.

CLARENCE R. CUMMINGS, manager of the Lake County Telephone Co., Dade City, Fla., was born at Freeland, Saginaw county, Mich., in 1864, and was educated in the common schools and the high school at Otisville, Mich. He spent his early days on the farm until 1887, when he entered the telephone business as "trouble shooter" for the Bell company at Saginaw, Mich. About six months later he was transferred to the construction gang and helped to build the first metallic line from Detroit to Saginaw, Mich. Three years later he was transferred to Jackson, Mich., as city foreman. He served as district foreman, with headquarters at Jackson, for a period of 18 years. Mr. Cummings built the first farm lines in Jackson county, Mich., about the year 1898, since which time practically all the farmers in the county have become telephone subscribers. After his long service at Jackson, Mr. Cummings removed to Dade City, Fla., and became manager of the Lake County Telephone Co. there. Mr. Cummings is a Mason, a member of the Independent Order of Odd Fellows, and of the Independent Order of Foresters.



ALVIN JOHN KOHN, of Geneva, Ill., sales manager of Cracraft, Leich Electric Co., was born at Reeseville, Wis., in September, 1884. He received his early education in the public school at Reeseville and in the high school at Columbus, Wis., and then secured a position as cashier of of the State Bank at Reeseville. He left this position to enter the University of Wisconsin and graduated in electrical engineering, receiving the degree of B. S. of E. E. His early experience included three seasons' work as field expert and salesman for the International Harvester Co. He entered the telephone business in June, 1906, with the Stromberg-Carlson Telephone Mfg. Co. His first position was in the factory of that company, after which he was transferred to the laboratory. After a training in the laboratory he was promoted to the engineering apparatus department and then received a thorough experience in the sales and sales engineering departments. He continued with the Stromberg-Carlson Telephone Mfg. Co. until June, 1912, when he accepted his present position. He is a Mason.

The Standing of Independent Telephone Company Securities

Bond Issue of Citizens Telephone Co., of Grand Rapids, Mich., Receives Unqualified Endorsement of Prominent Investment Firm—An Indication of the Growing Respect for Independent Telephone Securities—Letter from General Manager Tarte Showing Strong Position of Citizens Company

It was only a few years ago that the securities of Independent telephone companies were looked upon with ill favor by bankers and dealers in investment securities. But conditions have changed, as is evidenced by the accompanying reproduction of a letter which has been sent to its customers by one of the well known investment firms having offices in Chicago, New York, Philadelphia, Boston, London and other cities.

The Citizens Telephone Co., of Grand Rapids, Mich., a part of the bonds of which A. B. Leach & Co. has purchased, is one of the strongest and most successful Independent companies in the United States. As stated in the letter, the Citizens company is issuing bonds to the extent of $400,000, of which the Chicago allotment is $200,000. The bonds are in denominations of $100, $500 and $1,000 and are offered by A. B. Leach & Co., at 100 and interest, yielding 6 per cent. This company's unqualified endorsement of the issue is an indication of the growing respect for this class of securities. In a letter concerning this issue C. E. Tarte, general manager of the Citizens Telephone Co., says:

"Referring to the issue of $750,000 first mortgage 6 per cent. 10-year gold bonds of this company:

This issue is secured by an absolute first mortgage upon all the property, rights and franchises of this company, now owned or hereafter acquired. Only $400,000 of these bonds are to be issued at this time, the balance being reserved in the treasury and issuable only for additions and betterments to the system of this company subject to the approval of the Michigan Railroad Commission. These $400,000 bonds will constitute the only indebtedness of the company outside of our endorsements of $100,000 of bonds of the Citizens Telephone Co., of Battle Creek, and the Citizens Telephone Co., of Jackson, both of which companies, together with the Citizens Telephone Co., of Marshall, are controlled through stock ownership.

This company was organized in 1895 and was financed entirely by the sale of stock at par. On June 30, 1897, there was outstanding $86,934, par value, of the stock and there is outstanding at this date a total of $3,853,285, par value. Since October 1, 1896, the company has earned and paid annually eight per cent. dividends upon its capital stock.

With regard to the physical property of the company would state that we own 3,986 miles of pole line, all in first-class condition, together with 6,782 miles of aerial copper wire, 1,930 miles of aerial iron wire and 50,883 miles of copper wire in aerial and underground cables. We own exchanges in 68 cities, towns and villages in western Michigan and have in use at the present time 31,450 telephones. We own 4,600 miles of metallic circuit toll lines, mostly copper, and by means of these furnish long distance service to our subscribers. We have connections with the long distance lines and exchanges of other companies enabling us to reach 200,000 telephones in Michigan, including service to Detroit and vicinity. In addition we have excellent long distance connections with Ohio and Indiana.

Our Grand Rapids property, in addition to aerial poles, wires, cables, etc., includes 110 miles of underground conduit and the real estate upon which are located our Main, South and East Exchange buildings, in which the new automatic exchanges are installed.

The Grand Rapids plant represents an investment value of $1,413,351, or three and one-half times the outstanding bonded indebtedness.

Our gross earnings have increased from $43,856 for the year ending June 30, 1897, to $767,368 for the year ending June 30, 1912, and our net earnings for the same period have increased from $13,118 to $376,362. We expect that our earnings for the present fiscal year will show a very substantial increase over 1912."

The new bonds of the Citizens Telephone Co. are secured by first mortgage running to the Michigan Trust Co., of Grand Rapids, as trustee for all the bondholders. During the life of the mortgage the company is not permitted to pay in excess of 6 per cent, dividends on its capital stock. In addition to charging off 4 per cent. for depreciation annually on the value of its assets, as shown by its books, the company must pay into a sinking fund an amount equal to 1 per cent. of all outstanding bonds.

The authorized capitalization of the company is $5,000,000, of which $3,853,285 is outstanding. Because of the bond issue the company's stock has been entirely withdrawn from sale. The net earnings of the company in 1912

A. B. LEACH & CO.
INVESTMENT SECURITIES
CHICAGO
NEW YORK PHILADELPHIA BOSTON LONDON

8 SOUTH DEARBORN ST.
CHICAGO

Dear Sirs:

Permit us to urge your prompt attention to the enclosed circular fully describing

$200,000 CITIZENS TELEPHONE CO., FIRST MTGE. 6's
(Grand Rapids, Mich.)
Due August 1, 1923.

We feel that we are especially fortunate in being able to offer our clients these bonds at 100 and interest, - yielding 6%.

The CITIZENS TELEPHONE COMPANY has always been regarded as one of the most successful Companies in the United States. For the past sixteen years it has earned and paid annual dividends of 8% upon its capital stock.

These bonds are an absolute First Mortgage on all property of the Company which has total assets of practically six times the entire authorized bond issue.

For the year ended June 30, 1912, the Company showed net earnings of $376,362.55,- or, over 15 1/2 times the interest charges on the $400,000 bonds outstanding at this time. It is expected that the net earnings for the year ended June 30 1913, will show a very substantial increase over those for 1912.

These bonds carry our strongest recommendation and we believe they will meet with a very ready sale. If you are interested at this time, we shall be pleased to have you use the wires at our expense.

Yours truly,

CRG/b

Prominent Firm Approves Independent Bond Issue.

amounted to over 15½ times the interest charge on $400,000 bonds and the total assets of the company are practically six times the authorized bond issue.

The earnings of the company for the past five years have been as follows: 1908, gross earnings $603,701, expenses $317,391, net earnings $286,309; 1909, gross earnings $633,456, expenses $343,023, net earnings $290,433; 1910, gross earnings, $675,543, expenses $357,089, net earnings $318,453; 1911, gross earnings $719,841, expenses $381,411, net earnings $338,400; 1912, gross earnings $767,368, expenses $391,005, net earnings $376,362. The company enjoys a strong franchise position, in all important instances the franchises running beyond the maturity of the bonds.

Operating a Telephone System in the Land of Roses

Something About Charles A. Rolf, President and General Manager of the Southern Home Telephone Co. and His System Centering at Redlands, California—Views of His Rose-Covered Home and the Ideally Located Telephone Exchange

By J. D. Holland

People who live in those sections of the country where winter holds sway every so often, and where it is generally rigorous while in power, find it hard at times to conceive the pleasures of living and working in a climate which is twelve months summer and spring. To fully appreciate the illustrations accompanying this article they should be considered while the wind is whistling wildly past your windows and a snow storm is in progress, or, better yet, while a sleet storm is playing beautiful havoc with your lines. The two illustrations on this page are reproduced from photographs which first appeared in Scenic America. They show the home of Charles A. Rolfe, president and general manager of the Southwestern Home Telephone Co., which has its headquarters at Redlands, Cal., and operates exclusively in a large territory in the orange belt. The upper picture is an arbor of two-year old roses; the lower a growth of but one year. The picture at the bottom of the opposite page is from a photograph of the Home exchange, which comprises a complete city block, with a beautiful park at one side.

Mr. Rolfe's Home.

Mr. Rolfe, who has developed the extensive system of the Southwestern Home company, has been connected with the electrical field since 1877. He was born in Onondaga county, New York, January 5, 1854; was educated in the schools of Utica, N. Y., and received a certificate of proficiency from the board of regents of the University of New York State.

In 1877 he was elected secretary of the Utica Fire Alarm Telegraph Co., and was active in the manufacture, sale and distribution of telephone switchboards and apparatus for that company for several years. The telephone apparatus was of the Edison type and the switchboard of the Gold & Stock Telegraph Co. design. Exchanges were equipped by Mr. Rolfe in Utica, Albany, Troy, Schenectady, Saratoga, Cohoes, Gloversville, Johnstown, Little Falls, Rome, and many other locations in New York state.

He also equipped a large number of exchanges in other states and foreign cities. He designed the first exchange in Mexico for the City of Mexico, Chihauhau and Guadalupe and the exchanges were built with apparatus furnished by him. Mr. Rolfe was for some time connected with the Gamewell Fire Alarm Telegraph Co., in New York, and secured many important contracts for that corporation all over the United States and Canada.

Another View of the Rolfe Residence—One-year Roses on Trellis.

He was secretary of the Police Telephone & Signal Co., of Chicago, from 1887 to 1898, and in that capacity equipped many police departments with police telephone systems. He designed all of the exhibits of fire alarm and police telephone

systems for the World's Columbian Exposition, as well as the service plants for the protection of the Fair for both the police and fire departments of the exposition. The exhibits received first prize and he was awarded a diploma of honorable mention for skill and invention in the production of perfection in exhibits, which were awarded medals and diplomas.

Mr. Rolfe is the patentee of numerous inventions for electrical apparatus in the field of telephony, of practical worth, which are now in universal use. He has built and established several manufacturing plants for the production of electrical machinery and apparatus.

In the year 1905 he decided to go West and, after considerable travel, he located in Redlands, Cal., where he purchased an interest in the Southwestern Home Telephone Co., operating a large territory. He not only purchased this interest in the Home company, but also bought out all the Bell interests in the territory and merged the two systems. The Southwestern company now has traffic arrangements with all the telephone companies on the Pacific Coast, both Bell and Independent.

Mr. Rolfe is a member of the University Club, the Country Club, the Manufacturers & Merchants Association, the Chamber of Commerce and the City Water Commission, of Redlands. He is a member of the Elks, the Epsilon Tau Pi fraternity and the Telephone Pioneers of America.

Mr. Rolfe has had a busy time and success has crowned his efforts. He has a host of loyal friends, who expect to visit him in California when they go to the Panama Exposition in San Francisco in 1915.

Charles A. Rolfe.

Use of the Telephone in the Fishing Industry.

The fishermen off the coast of New Jersey find the telephone indispensable in marketing their catches, says the Telephone Review. Without it there would be absolutely no way of communicating with the markets and closing sales. As fish are perishable, it is very essential that they be sold at once. By telephoning the dealer knows at once what the market wants and where the best prices can be realized. There are also many telephone calls received from nearby customers who inquire what has been caught and place their orders according to the catch.

A typical example of the value of the telephone in this industry is a case cited of a dealer who had no telephone and sold a large quantity of fish to a local concern at six cents a pound, while one of his competitors, who had called up New York, sold his catch at twelve cents. By spending 50 cents for telephone charges, the latter dealer realized twice as much as the former. Another dealer one day lost $2 a barrel on a large quantity of fish because he did not use the telephone.

One of the pioneers of the fish business, who was the first subscriber of the town of Galilee, N. J., for telephone service, sometimes receives 150 telephone calls for fish in a day. He tells entertainingly of the early days before the telephone was used. Then the dealer took a chance in shipping his fish, not knowing whether he would make a large or small profit or nothing at all. He says the telegraph was used only occasionally to ascertain market prices.

An interesting story is told of a fisherman who had 300 barrels of fish held up because his telephone service was interrupted by a storm. He walked five miles to a telephone exchange to report. He could not afford to have his telephone out of order.

As one old salt said, "After a morning's catch, first to the telephone—then to breakfast."

It is plain to be seen, therefore, that the telephone is indispensable in this, as well as every other line.

A Fine Park Adjoins This Redlands Exchange.

Words in the Telephone.

Long distance telephoning has become a science on its own account, says a writer in Popular Electricity. It has called into existence a class of operators who are valuable by reason of the clearness and sharpness with which they can pronounce words while speaking rapidly.

It has also developed the fact that the French language is better adapted to the purposes of the telephone than the English. The ordinary business of the long distance telephone between Paris and London is carried on in the French language. It is stated that the considerable proportion of sibilant or hissing syllables in English renders it a less easy and accurate means of communication.

Certain English words are especially difficult of transmission by telephone. The word "solder" is cited as one of these. Proper names frequently occur, in the midst of an otherwise perfectly audible and intelligible conversation, which the ear cannot catch. These must be spelled out, involving delay.

Expert telephone operators in the Reuter press service between Paris and London have succeeded in transmitting messages in the French language at the rate of 190 words a minute. This is at a much swifter rate than that employed in an ordinary conversation.

The speed at which these messages can be transmitted is limited, however, by the proficiency of the stenographers, who must take them down from the receiver's mouth, and the stenographers acting in concert have limited the number of words which may be taken down in three minutes to 400. The three minute period obtains here.

Hitch Your Wagon to a Star! Aim for Ideal Service

Discussion of Standards for 100 Per Cent Telephone Service—A Few Factors Which Merit Consideration Non-Productive Elements—Application of Efficiency Engineering to Produce What May Be Termed Ideal Telephone Service

By Jay G. Mitchell

In an editorial, The Automobile, of July 3, commenting on a fuel economy test made by the Franklin company, said:

"Ideals are our greatest sources of inspiration. Without them we become prosaic. We need the high spots in order to make our average reasonably high. We need the mountain tops in order to take away the monotony of the plain.

We passed a mile-stone last week in fuel economy when a car specially fitted out for economy made an official test and averaged over 83 miles to the gallon of fuel. When an 18-horsepower car can do this, it shows us what the range of possibility is. It is true that hundreds and perhaps thousands, of drivers would not derive any pleasure from driving a car over the roads such as this one had to be driven over to get such mileage. Grant this and still we have inspiration, a direction in which to aim. If a certain design of body, certain carbureter adjustments, certain methods of driving, will give such phenomenal results there is something for each of us in such work. We do not hope to equal it, we may not even approach it, but it tells us of what the possible is; in other words, it adds one more touch of the interest which is always found in the victories that lie ahead. The pleasure of accomplishment is one of the greatest in the world. If everything were accomplished, all interest would be dead. We are indebted to the Franklin company for what it has done, and hope that it will continue its work and inspire other makers."

Jay G. Mitchell.

Imagination, always supposed to be the presiding genius of poets, promoters and investors, has been enlisted in the forces of industry as the right hand support of progress and efficiency. Keen observers found that industrial life was filled with unprofitable and costly items, and the imaginary result obtained by eliminating all unnecessary and non-producing processes was so fair to look upon that careful studies were made in many industries to establish the accuracy of the desirable result promised by the man with the imagination.

This is commonplace now, of course, and the tremendous results obtained in the direction of efficiency, increasing production and reducing costs through the development of practical working standards to conform to that which in the beginning was an imaginary ideal, justify the method. Under another name, the traffic departments have been studying the process of handling telephone traffic along the same lines for years until now in almost every plant, useless motions have been eliminated with a surprising improvement not only in efficiency but incidentally in service. Should this method be applied to the service itself, it would be useful and would give rise to new and radical conceptions of the elements of ideal telephone service, broadly considered to include the subscriber, the operator, and the plant.

Experience is often only another name for classified knowledge of the results of rule of thumb development. Therefore, for the purpose at hand, experience must be considered as an inconsistent monitor to be treated with respect but to be considered reckless and wasteful until proven otherwise. The first step is to determine by careful study and consideration the absolutely indispensable elements, and then to ruthlessly eliminate all others, subject to the physical limitations in the case.

In the industry of furnishing telephone service, the determination of the absolutely essential elements is very simple and may be accomplished by answering the question, "What do your subscribers pay you for?" In considering this carefully, it is at once apparent that 100 per cent. telephone service calls only for the ability to converse at will from one station to the other stations of the system. The public may be presumed willing to assume the posture required to converse to a distance, i. e., to approach the telephone and place the receiver to the ear. Any other motions necessary to secure service reduce the efficiency from 100 per cent. to something less, an unnecessary sacrifice.

The connection would have to be quite instantaneous for 100 per cent. service. Obviously this is an absolutely impractical requirement and is to be met, as far as possible, by reducing the time required to obtain the connection to the minimum. The conversation would be secure from eavesdropping, privacy being insured by the operation of mechanically controlled devices which positively produce the desired result. This requirement is satisfactorily and perfectly met in modern systems.

The service would be available and assured, whenever the subscriber assumed the proper posture in relation to the equipment, i. e., whenever the receiver is placed to the ear.

Perfect service would be accurate, the personal element, which is the cause of a large proportion of operating errors, being eliminated by the same method as it is eliminated in other lines of industry, namely, the use of mechanical devices to perform all similar operations which require frequent repetition. Service of 100 per cent. efficiency must be accurate.

It is of course apparent that no system, at present available, affords facilities for furnishing 100 per cent. efficient telephone service. But development is continuous and there is now available, equipment by the installation of which the operating telephone companies may furnish such an approximation of perfect service as to place themselves far beyond the reach of successful competition.

From another standpoint, namely, from the standpoint of the company 100 per cent. service would no doubt call for these conditions of operation:

A. Minimum cost per message handled.
B. Minimum cost per subscriber's station.
C. Elimination of equipment items which by their nature are a possible source of trouble, giving rise to subscribers' complaints.

D. Elimination of the personal equation in operating to the maximum degree possible; employment of mechanical operations.

E. Reduction of employes' welfare expense items by reduction of the number of employes.

F. Freedom of operating from the law of diminishing returns and substitution of an operating law by which the profit of the company is increased in proportion to the number of its subscribers.

G. Use of equipment free from parts requiring frequent and irregular renewal.

H. Elimination of conditions requiring the employment of a large force of low priced, inefficient, unreliable employes.

I. Elimination of conditions requiring employment of large number of high-price employes.

J. Definite determination of income and expense items in relation to the number of subscribers to produce financial stability and to enhance the value of outstanding securities.

It is perfectly obvious that there is no equipment offered today which will enable the operating company to furnish service conforming to all of the conditions which are outlined as being ideal. In fact, the attempt to enunciate the conditions under which ideal service might be defined is not to be considered as an effort to define conditions of service which are actually possible, but rather to define conditions of service which would be obtained under ideal conditions. There are a number of the conditions laid down, however, speaking from the standpoint of the subscribers as well as the operating company, which can be approximated in any plant and this is where the value of this method would be found to lie. Local conditions should be carefully scrutinized and studied, and such means of operating installed so as to approximate as many of the requirements for ideal service as possible.

At this point the question of standardizing the methods of operating naturally intrudes itself and upon careful consideration it will be readily seen that the recent commendable effort to standardize methods and conditions is an attack upon the same proposition from another direction. In fact standard operating conditions must in their very nature be based upon some such study of ideal conditions as has been outlined.

The value of a study of this sort lies in the fact that it looks to an improvement of service and the improvement of service is the most effective weapon at hand to meet and overcome competition.

Seeking Plan for Combination of Michigan Companies

Railroad Commissioner Hemans Unable to Ascertain Attitude of Wilson Administration on Subject According to Article in Detroit News Tribune—Interstate Commerce Commission to Make Valuation of Michigan Companies in Fall—Some Rate Inconsistencies

"What is the attitude of the Wilson administration toward a natural monopoly?" asks the Washington correspondent of the Detroit News Tribune.

Lawton T. Hemans, railroad commissioner of Michigan, has spent the past two days in an effort to find out, and he is leaving for home without having his desire for information gratified.

Mr. Hemans is trying to straighten out the telephone situation in Michigan, which is badly mixed. He could do it, he believes, without coming to Washington, if it were not for the wholesome fear of prosecution under the Sherman Act which holds back the telephone people. Hence his visit and its disappointing result.

He told the department of justice that in Michigan there is the Michigan State Telephone Co., adjunct of the Bell interests, controlling the telephone service of the largest city in the state, and covering the state as a whole in a more or less desultory way. Scattered through the state are a large number of corporations, voluntary associations and individuals, giving telephone service of greater or less extent. There are about 1,000 of these Independent concerns. The result is an enormous duplication of equipment, a waste, and an unceasing annoyance.

Mr. Hemans stated that of the Independent concerns about one-third are incorporated. But, he added, of the Independent corporations only about five are of size. These range, he said, from a property ownership alleged to be from $1,000,000 and over, to $4,000,000 and over. The five are the Citizens, Valley, Union, Southern Michigan and United Home. The Citizens, with headquarters at Grand Rapids, covers a considerable area of the state, and in that area it has 39,006 telephones as against 33,729 owned by the Michigan State company in the same territory. The Union has 11,425 telephones, and the Michigan in that territory 3,232. The Southern Michigan has 5,940, and the Michigan 3,158. The United Home has 5,209 and the Michigan 2,350. Only in the territory served by the Valley does the telephone trust outweigh the Independent. The Valley has 6,592 telephones and the Michigan 11,989.

The Plan of Combination.

The figures, Mr. Hemans said, come from the Michigan State people, and therefore probably do not overstate the number of telephones held by the Independents. Yet they show that in a great many places all through the state, people are compelled to have two telephones on the premises. The nuisance thus created is intolerable it is claimed. Mr. Hemans wanted the administration to define its attitude toward the proposition of an arrangement whereby the Michigan State company could sell out to the Independents in territory where the Independents are the stronger, and the Independents sell to the Michigan State where that concern predominates. With it he wanted an additional stipulation made that in all cases, the patrons of the Independents should have access to the nation-wide long distance facilities of the Michigan State company on the same terms as those enjoyed by that giant company's own patrons.

He told the department the Michigan State company was willing to negotiate for such a settlement of the situation, but did not dare to proceed for fear the administration would prosecute. This fear, he said, had brought things to a standstill, although the people in some parts of the state were holding mass meetings to protest against the continuation of the dual telephone outrage. He said the telephone situation in Michigan had reached almost unprecedented development through the Independent companies, and that there was hardly a bigger question pending in the state. The people are entitled to some settlement, he said, which will give them a uniform service throughout the state and universal access to the long distance lines of the Bell.

They Demand Information.

The attorneys of the Michigan State company apparently have informed that concern that if it be a violation of the anti-trust law to buy out an Independent company, it is just as much a violation to sell to one. Mr. Hemans said they would not move until they had found out whether they were liable to prosecution. Under the Taft administration the attorney-general had looked into the matter

and had decided it was not a violation of the Sherman law, and upon the strength of that the Michigan State had bought out the Home Telephone Co. in Detroit.

The people of the state metropolis are now enjoying one telephone, said Mr. Hemans, and this is true of a considerable territory around that city controlled by the Bell interests. If this sort of a deal could be made with the five big Independent concerns, it was likely the Michigan State could be induced to let go of all claim to the territory covered by them, or to a good share of it, and be satisfied with only the tolls derived from its long distance service, Mr. Hemans added.

The attorney-general referred Mr. Hemans to Assistant Attorney-General Fowler, who informed the Michigan commissioner that the administration probably would not have its policy in such a case formulated for about six months. He was inclined to think the project was entirely justifiable, but he could not say what the administration might do about it. In fact, he did not want to go too far in the matter, as he expects to be superseded by a democrat in the near future. He suggested that Mr. Hemans also consult the Interstate Commerce Commission.

The commission informed Mr. Hemans that in the fall it was the intention to have the telephone system in Michigan inspected and valued. But of course this might not include the Independents doing an exclusively Michigan business, and again it might. This depended upon the decision of the commission to be made later. Mr. Hemans therefore will suggest to the state government that if the Interstate Commerce Commission comes into the case for the purpose of valuing only the interstate telephones, the state join with the commission and have all the telephone property in the state valued at the same time.

RATES NOT UNIFORM.

When this is done, the state law to compel reasonable uniformity in rates can be enforced, and this in itself will go far toward hastening the end of the duplication of telephone service. Thus, for instance, the commissioner says, he understands the Bell rate in Grand Rapids is $18 a year and in Kalamazoo $24. But the commission does not know whether it ought to order the Kalamazoo rate cut to $18, or the Grand Rapids rate raised to $24. But after the property has been appraised, the state commission will be able to decide. If the Grand Rapids rate were to be ordered raised to $24, it probably would drive Michigan State company out of that territory, as it has been hanging on there only by means of a rate $6 a year lower than the rate of the Independent company.

At any rate there can be no immediate solution of the matter. The Michigan people, who have two telephones will have to keep on having them for a while longer until the administration decides whether throwing one of the telephones into the alley is a violation of the Sherman law.

Proposes Rate Reduction for Pacific Company.

James T. Shaw, of San Francisco, rate expert of the California Railroad Commission, has made a report recommending that the long distance rates of the Pacific Telephone & Telegraph Co. be reduced to an extent which, it is said, would cut the receipts of the company nearly $400,000 a year.

Toll Rates by Number from Albany, N. Y.

For the purpose of making toll rates uniform for uniform distances the New York Telephone Co. has announced a new schedule of toll rates out of Albany, N. Y. The principal feature of the new system is that it permits a subscriber to call by number instead of by name but the method of calling by name is still left optional. It is expected that users of the toll lines will be able to make a considerable saving under the new rates, which date from July 1. The company's officials estimate this saving for the Albany territory subscribers at over $650,000 a year. The table below gives a comparison between the new rates and the old:

	—Old Rates—		—New Rates—	
Albany to—	By name	By number	By name	By number
Amsterdam	$0.25	....	$0.25	$0.20
Hudson	.25	....	.25	....
New York	1.00	....	.90	....
Schenectady	.20	.15	.15	.10
Troy	...	.10	.10	.05
Watervliet	...	.10	.10	.05

Wireless Telephone Proposal.

Three miles from Guernsey, England, lies the island of Herm, containing about 40 inhabitants. It is clear that for so small a community the expense of either a submarine cable to Guernsey or a modern wireless telephone station with its expensive plant, is out of the question. It is, however, now being proposed to link up Herm by means of a telephone on the old "conduction" system similar to that in use for a dozen years or so at the Skerries Lighthouse.

The base line in Herm would be over a mile in length, terminating in the sea at each end, while in Guernsey a number of base lines could be experimented with from one mile to eight miles in length, also terminating in the sea.

The chief interest of the experiment lies in the proposal to use the lighthouse armoured cable as part of the base line for Guernsey, since by trying the results with the land line plus and minus the cable some new light might be thrown on the relative parts played by conduction and induction in this method of communication, still a disputed point. The experiment will be watched with much interest on this account, should it be carried out.

Improvements and Earnings of Oil City Company.

At a recent meeting of the directors of the Petroleum Telephone Co., Oil City, Pa., the conduit work that is being done by the company was approved and General Manager W. S. Paca was authorized to proceed at once with the completion of the conduit system in the congested districts with the purpose of relieving the congestion of overhead wires as quickly as possible. The company is making direct underground connections with the National Transit Building, First National Bank, Levi Block, Oil Exchange, Chambers Building and Veach Building, and will make direct connections with all prominent buildings located along the route of the conduit system.

Toll Rate Reduction in Nevada.

The railroad commission of Nevada has ordered a reduction of the long distance rates of the Pacific Telephone & Telegraph Co. in Nevada.

The long distance rates of the company serving Reno, Carson City, Dayton, Virginia City, Verdi, Wadsworth, Fallon, Lovelock, Winnemucca and other intermediate points are now constructed upon an air line mileage basis at a base rate of 5 mills per mile, plus 5 cents for terminal charges for the first minute of service and 50 per cent. of the base rate of 5 mills per mile for each additional minute or fraction thereof. The reduction which will be affected by the new schedule will average 12 per cent.

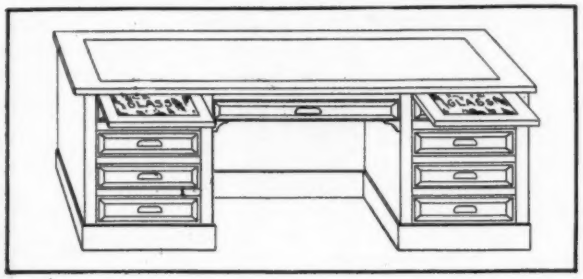
Mutual Merged with Independent at Hoyt, Kan.

The Farmers' Telephone Exchange, of Hoyt, Kan., a mutual company, is about to be merged with the Hoyt Telephone Exchange, the Independent company. The mutual company includes four lines and about 25 subscribers in Jackson county, Kan.

Practical Subjects—Letters and Discussions

Making Use of Waste Space.

The modern ordinary office desk, whether flat or roll top, is usually equipped with two sliding shelves, one to the right and one to the left of the person occupying the desk. These slides are provided for the use of a stenographer.



The Sliding Shelves Will Hold Useful Data.

For this purpose but one of them is necessary. The other affords a place for a desk telephone convenient for the user.

Another purpose has been discovered for these slides. An ingenious person had the slides removed from the desk, and countersunk to the depth of one-quarter of an inch. In this space a piece of plate glass was fitted in such a manner that it could be easily removed. Beneath the glass a list of telephone numbers, and other memoranda was placed for ready reference.

The diagram shows the idea which is simply the transferring of the plate glass frequently seen upon the top of desks to the sliding shelf. This arrangement in no way interferes with any other purpose for which the slides may be used. Celluloid may be substituted for glass.

Control Through Commissions—An Open Letter.

The men in control of the business of the Bell telephone system evidently realizing, finally, after about ten years of active growing competition, that they could not, with all their influence and money, cope successfully with the men in control of the Independent plants throughout the country in the open field of "opposition," cast about for some certain means to again get the mastery of the big and expanding business. They had found with great disappointment, that in practically each local situation, the Independents, where they had succeeded in establishing an exchange, could control the field, as they, almost invariably, were locally interested and therefore fighting on home ground. The so-called "political" control previously depended upon by the Bell people, was not to be depended upon under the changed conditions, as the local people could over-match them, hence some better means of control, for control they would, had to be resorted to.

The agitation throughout the country for the commission form of government for cities and state departments, etc., was becoming popular, therefore it was conceived to be the wedge that must be driven into the dilemma log and rend it forthwith. The Bell people had secured a law behind which they operated in a New England state, where they had always dominated, that made it necessary for a would-be competitor to show that competition was necessary and desirable before it could be established. The state authorities having to "be shown" in each case, appeared to be uniformly of the opinion that competition with the existing Bell plants was not necessary or desirable. Whether or not this opinion was influenced in any manner by the Bell people, it was found to work very satisfactorily for them. If such salutary results could be secured generally by having a similar law adopted by each state, particularly with the desired law hedged about and strengthened and with its claws covered by supplementary requirements as to their own and other utilities' conditions, together with a state commission, also created by them, to have charge of the application of the laws, all would be well and they would come into what they considered their own again, i. e., the absolute control of the telephone business in these United States.

That general utility commissions should be created or that existing railway and telegraph commissions should be converted into such general commissions of their proposed type, together with the fact that fat salaries for the commissioners and a host of subordinates would be provided, were factors of anticipated safety not lost sight of in the shrewd scheme of getting the laws passed and the commissions provided, and letting it become known, as a state secret, that the Bell system was responsible for it all. Also, it was evident that under almost any circumstances, it would be much easier to treat with a small board of commissioners in each state than it would with the average city council, even in an average city in any of the states. Thus the good work began.

In these United States of America, we have 48 states, and the work has now progressed to the extent of having the laws desired passed in 35 of the states, Illinois being the latest state to fall in line and to thus join the Bell union of states. What a pretty play it has been, viewed from the wings, and how smoothly it has progressed, until it is now almost complete, and at that, with the dear public utterly oblivious of the gigantic job which has been put over, and, yet more strange, with the interesting fact that many of the Independents who had the best of the former situation, assisted in the matter.

The Bell system's record shows that it has been dilatory in many instances and has been forced by the advanced methods of the Independents to adopt many good things in a business way for its self preservation. But in this particular instance it has demonstrated a keenness of perception, a craftiness of method, and a thoroughness of action that has not been evident heretofore, and which to the general public and to the general run of Independent men, has not as yet become apparent. That the 13 remaining states will be provided with this Bell panacea in short order, regardless of the additional extraordinary expense, goes without saying, as their success thus far fully warrants proceeding; besides the general sentiment by the public is that the scheme of commission control of such utilities will be beneficial.

Admitting that universal commission control will be ultimately beneficial and that the Bell interests, regardless of their far sighted and far reaching intent to again secure control thereby of the telephone business of this country, have created and secured the conditions, it now behooves the public and the competitors of the Bell system to awaken to the situation and to co-operate with each other to the end that the Bell system may not, or cannot, control the commissions. For as certain as fate, it will be demonstrated as to commissions, as it has been as to trusts, that there will be good commissions, when they have to be, as well as bad ones.

The general public, from which the titanic telephone trust, as well as all the other trusts, secures its sustenance, should be made acquainted with the commission conditions for control; and the public, not the trusts, particularly

this creative telephone trust, should then command the commissions. This would insure proper treatment as to service; as to the rates for same; as to adequate development; and as to up-to-date apparatus and plants. These results of course are to be expected by the public from such laws and their application or control by the commissions. But unless the people and not the Bell system control the commissions, the direct reverse of these desirable features will result, as it has been repeatedly demonstrated that the Bell system will not practice what it publicly preaches, and will not measure up to the standards its employes prate about when it gets control.

Columbus, Ohio. N. G. Warth.

Letters from a Retired Lineman to His Nephew.

Podunk Valley Farm.

Dear Ben:

I guess this little lay-off of mine will make a confirmed loafer of me, for Doc Stuver and Editor Skinner have been making the porch a common loafing place. I guess I'd be pretty lonesome if it wasn't for them. When it comes to telling things that are as impossible as a trip to the moon, they have the long distance record and then some.

Once in a while they take up a line of talk where I can break into the game. When I do get a chance I can generally get them to listen.

Skinner was a soldier in the Civil War and of course he has a place to take refuge whenever he gets in a corner.

The other day he told about a fellow being blown sky-high by a keg of powder. He said the fellow was sitting on a plank laid across a keg of black powder. The word black made it sound big, but who ever saw any white gunpowder? Anyway, Mike,—of course the fellow's name had to be Mike or Pat, and Doc says sometimes Skinner calls it one and sometimes the other—was sitting on the powder keg when someone dropped a match into it, just for a joke. In the smoke and confusion Mike disappeared.

Skinner claimed he saw him in St. Louis ten years after the war. Mike claimed he went up a mile or two, but hung to the plank, sailed around almost all night, and finally landed in the top of a tree. He claimed he was so far from camp, and the war was so near over, that he didn't think it worth while to report at the front again.

Speaking of explosions reminds me that Doc went out to Big Run the other day to tinker up a fellow's hand who had attempted to find out why a dynamite cap did not explode from the fuse. Maybe he found out, I didn't ask Doc, but anyway he is shy three fingers, a thumb, and one eyelid as a result of his investigation.

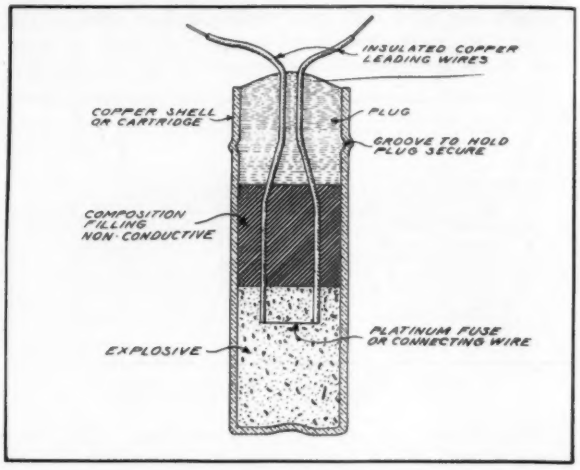
I saw a list of "Don'ts" once with reference to blasting caps. There must have been at least 20 things you shouldn't do with them, but the last one was all I remember. It was: "Don't have anything to do with them, if you can avoid it."

The fact is, the greater the factor of safety in the dynamite sticks, the smaller it is in the caps. A cap will not stand any excitement. It is a very nervous contraption. It is always ready to attend strictly to business on an instant's notice. I never heard of one being a "fizzle," as the boys say about firecrackers.

Dynamite is handled in such large quantities that it must necessarily be made "fool-proof" to a large degree. Therefore the caps must be made exactly the reverse and of very high explosives to accomplish the purpose of setting off the charge.

Men have successfully crimped a cap onto a fuse with their teeth. They only have to be unsuccessful at that trick once. It's someone else's job from then on. You've heard of rubbing things the wrong way. There isn't any sure right way to rub a fulminate of mercury cap. That's what they are charged with. The secret of their makeup should be generally advertised to satisfy every possible form of human curiosity.

In handling such high explosives, accidents are quite liable to occur. I remember one rainy day we were held up at a farmhouse where there was a "smithy." The foreman saw a good chance to put the tools in shape, so we carried the whole outfit to the shop and all hands set to work, sharpening and



Electric Blasting Cap.

cleaning up. A "ground hog" was pulling the things out of the box when all of a sudden there came two loud, sharp, reports in quick succession.

The "ground hog" tumbled over as if he was shot, and in reality he was. One side of his face was filled with fine pieces of copper from a fuse cap. He was hustled off to the hospital in a hurry. When he came back to us a month later his face was as mottled as a turkey egg and the hearing of one ear was gone.

How those two caps come to be in the tool box or how long they had been there, no one could tell. And that is the point I am trying to impress on you—the very uncertainty of the blamed things. You might carry one in your vest pocket a year and again you might carry it only ten minutes.

Of course you know there are two kinds: one for a powder fuse and the other for magneto, or battery. The fuse cap is the most dangerous as there is no filling over the mercury. Attaching the fuse is not a perfectly safe occupation. There is a tool made for the purpose of crimping the shell around the fuse without disturbing the mercury, and to use a knife, pliers, or one's teeth for the purpose, adds to the danger 100 per cent. I'm going to draw you a sketch of how the electric blasting caps are made.

The operation is simple enough. The electric current heats the platinum wire, which ignites the explosive.

You can burn what dynamite you have left over, but there is no place above or below the surface of the earth where a blasting cap is safe, except, as old man Barker used to say, "on the tip of a lightning rod, but a man would run an awful risk in hanging one there."

Will be around in a few days now, I guess. Have got to rustle around and find a bull terrier to eliminate the cats.

Your Uncle Dick.

Operators Needed in Flood District.

The telephone companies at Dayton, O., are experiencing a scarcity of operators since the flood. The Central Union Telephone Co. lost 45 operators following the flood, some of whom, it is presumed, left the city with their parents. Just why girls desirous of learning the telephone business are so scarce no one seems to be able to explain, but the fact remains and the telephone companies are exerting every effort to get competent help.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities, and Actions of City Councils Bearing Upon Franchises, Rates and Service

How Michigan Taxation Plan Affects Companies.

When the state of Michigan changed its methods of taxation of telephone companies from the specific to the ad valorem basis, it accomplished a radical change. The specific tax had been 3 per cent. of the gross annual income of the telephone corporations of the state. Under the ad valorem tax method such corporations are taxed on the basis of the value of their property as fixed by the State Board of Tax Commissioners whereas other corporations are assessed on the value fixed by the State Board of Assessors, on the basis of local assessors' estimates.

It is contended that the State Board of Tax Commissioners assesses telephone companies on the basis of their true value as required by law, whereas the valuations reached by the State Board of Assessors on other property is considerably less than half of the valuation found under the United States census practice. The ratio of taxation for all is found by dividing the total taxation of the state by the total value of property in the state, exclusive of the railroads and similar corporations. The divisor is thus reduced by the amount that other property is undervalued. This means an increased ratio of taxation, in the first place, and an escape from the burden of its application on the part of those whose property is undervalued, with a correspondingly increased burden of taxation for telephone companies.

The change respecting the taxation of telephone companies in Michigan affects the Citizens Telephone Co., of Grand Rapids, to the extent that instead of paying 3 per cent. of its gross revenue, as formerly, it is now expected to pay a sum equivalent to almost 7½ per cent. of gross revenue. It is plain that this is an exorbitant tax, and relief should be given the Citizens company.

The rate of taxation of the Bell companies throughout the United States is about 5 per cent. It is unfair to make the Citizens company pay the highest tax rate of its kind in the county. TELEPHONY would like to have its readers advise it of taxes paid in different sections and in towns and cities of different sizes, as possibly other Independent telephone companies are being discriminated against, this information to be used to try to secure to all Independent telephone companies a uniform and just rate.

Consolidation of Service in Michigan.

At a meeting held recently in Grand Rapids, of the directors of the Benzie County Consolidated Telephone Co., arrangements were completed for taking over the Independent and Michigan State Telephone Co.'s exchanges in that county, the new company to have connections with the Citizens Telephone Co., of Grand Rapids. The consolidation eliminates competition in Benzie county and gives the Bell and Citizens companies the same facilities for long distance service.

Wisconsin Commission Rules Against Physical Connection.

The Wisconsin Railroad Commission has denied the application of the New Lisbon Mutual Telephone Co. for an order directing the Mauston Electric Service Co., also a telephone concern, to make a physical connection between its lines and those of the Mauston company. The New Lisbon company operates a telephone system in and around New Lisbon, Hustler, and Camp Douglas, in Juneau county, and Clifton and Shemington in Monroe county, with its principal office at New Lisbon. The Mauston Electric Service company operates a telephone system in and around Mauston.

The answer of the Mauston company denied that public convenience and necessity require such physical connection. The Juneau Electric Co. and the Wisconsin Telephone Co. were permitted to intervene, as parties to be affected by the order in this case.

Closing its decision, the railroad commission says:

"Both the Juneau Electric Co. and the Wisconsin Telephone Co. anticipate that any physical connection between the lines of the parties to this case which would not require a message from parties using the service would injure the toll business between New Lisbon and Mauston.

It was suggested that the New Lisbon Mutual Telephone Co. might connect for toll purposes with the Juneau Electric Co., and so obtain toll connection with Mauston. This would not accomplish the purpose of giving individual subscribers free service to Mauston, but it would give adequate toll connection. It does not seem that any such connection as that sought by the New Lisbon Mutual Telephone Co. ought to be ordered, at least under the circumstances existing in this case. If the subscribers of the New Lisbon Mutual Telephone Co. need connection with Mauston, such connection can be obtained under conditions which will be fair to all parties concerned. The complainant, however, appears not to be seeking a connection on a toll basis, but rather a connection which would inure to its own benefit almost exclusively, and would in some respects be decidedly disadvantageous to the other companies concerned. Under the circumstances the prayer of the petitioner must be denied."

The decision also stated that the rates for rural telephones are the same for both companies, but "it is undoubtedly true that physical connection on the terms outlined might lead to some loss of business by the Mauston company as well as to the introduction of competition where such competition would be of no value."

Hearing on Physical Connection in Wisconsin.

The Wisconsin Railroad Commission heard arguments recently on the petition of E. D. McGowan, of Janesville, Wis., for an order directing the Wisconsin Telephone Co., of Milwaukee, Wis., to institute physical connection of its lines with those of the Rock County Telephone Co., of Janesville. In order to ascertain more fully local demands for such connection, the commission adjourned the hearing until the latter part of July, in Janesville. Attorneys representing the Wisconsin Telephone Co. protested that physical connection would ruin its local exchange and that it would amount to confiscation of property. Richard Valentine, secretary and general manager of the Rock county company, said he had no objection to making the connection.

Oklahoma Commission No Power to Penalize.

The power of the Oklahoma Corporation Commission to penalize the Pioneer Telephone Co. one-third of its customary rates in Muskogee, Okla., during the month of October, 1910, has been denied by the Oklahoma supreme court.

The commssion had made an order giving the company until November 1 of that year to put its exchange in per-

fect condition and ordered that the rates be reduced while the changes were being made effective. The reduction meant a net loss to the company of $4,233. The court reversed the commission's order and held that the order to improve service was the only one which could properly have been made by it.

Decisions by the Oklahoma Commission.

The Oklahoma Corporation Commission has ruled that the Comanche Telephone Co., of Comanche, Okla., must employ capable and efficient operators for both day and night service and must give free and unlimited service from the city to rural lines, instead of charging 25 cents for such calls, and that in the case of long distance service no greater charges shall be made than are charged by other lines for like service. The case came up on complaint of R. S. Bristow, who alleged that telephone service at Comanche was poor, especially at night when a boy was put in charge of the board and allowed to sleep in the office, and that a charge of 25 cents was made for all calls on rural lines.

In a complaint filed against the Independent Telephone Co., of Cestos, Okla., one subscriber testified that for apparently personal reasons it was impossible for him to get a telephone installed by the company. The commission ruled that service should not be denied to any person desiring to become a subscriber so long as the applicant meets the conditions set down by the company.

Kansas Companies to Make Report.

The Kansas Railroad Commission has mailed blanks to more than 700 telephone companies upon which the companies are required to make complete report regarding their affairs. There are 20 companies in the state having an investment of more than $50,000 each and their reports will be made on separate blanks.

The remaining companies range from an investment of a few hundred dollars up to the $50,000 mark.

All companies are expected to make sworn statement as to their financial standing, rates, patrons, earnings or losses, number of employes, wages paid, number of miles of wire and cable, and such other similar facts as will give to the commission complete and detailed information as to the condition of the individual companies.

Rate Hearing at Richmond, Ind.

Judge J. L. Clark, of the Public Service Commission of Indiana, conducted a hearing at Richmond, Ind., on the petition of telephone subscribers of Boston township for a reduction in the rates of the Richmond Home Telephone Co. This company has 60 telephones in the township, of which four are business telephones. In October, 1911, the rates were raised from $15 to $18 for residence telephones and from $30 to $33 for business telephones. The petition is for a return to the old basis.

Manager Bailey of the telephone company declared on the stand that the telephones were being operated at a loss before the raise in rates. Judge Clark stated that the case might necessitate the appraisement of the plant and equipment used in Boston township, by experts employed by the commission.

Bell Company Wants Higher Rates in Indianapolis.

It is stated that the Central Union Telephone Co. is planning to go before the Public Service Commission of Indiana with a view of showing that the present telephone rates in Indianapolis do not admit of its making a fair return on the money invested in the property. Under the utility commission law if a company can show that prevailing rates are too low to admit of a reasonable profit, it is mandatory upon the commission to permit an advance in rates. The Bell company is preparing to spend $650,000 in improvements in the Indianapolis district during the current year.

New Toll Rate Schedule in Washington.

The Pacific Telephone & Telegraph Co. has filed with the Washington Railroad Commission a new schedule of long distance rates which will become effective on July 16 unless suspended by order of the commission and which, it is estimated, will effect an increase of 6.6 per cent. in the gross revenue of the company within the state. It is estimated that the increase on interstate and intrastate traffic combined will amount to 11.4 per cent.

In the filing of its schedule the company states that "a study of the existing toll rates indicates that various methods which have been employed in making rates have developed various inconsistencies regarding the rate charged, length of haul and initial period allowed."

The basic rate used in the new schedule is half a cent per air line mile plus five cents terminal charge for an initial period of one minute. The rate for 20 miles under this system, therefore, is 15 cents.

An indication of how the proposed new rates will affect the present rates is shown by the following schedule, giving a number of charges from Spokane:

	Air Line Mileage	Present Rate	Proposed One Minute	Proposed Two Minutes
Clarkston, Wash.	91	$ .50	$ .55	$ .65
Chewelah, Wash.	43	.30	.30	.35
Colfax, Wash.	56	.25	.35	.40
Davenport, Wash.	34	.25	.25	.30
Ellensburg, Wash.	162	.75	.90	1.10
Rossland, B. C.	91	.55	.55	.65
Portland, Ore.	299	1.00	1.55	1.95
Seattle, Wash.	236	1.00	1.25	1.55

Some Figures on Air-Line Basis of Rate Making.

J. L. Swayze, of New York, general counsel for the Chesapeake & Potomac Telephone Co., has been engaged in some arithmetical gymnastics as a means of combating a complaint as to rates between Baltimore and Ellicott City, Md., made by State Senator Edward M. Hammond, to the Maryland Public Service Commission.

In a 20-page brief to the commission Mr. Swayze takes up the suggested "air-line" charges and states that there are approximately 30,000 telephone subscribers in the Baltimore area. If the air-line distance between subscribers' stations were used as a basis of charges, he says, this would necessitate 450,000 separate rates for local subscribers. Each subscriber would have 30,000 individual rates.

A record showing the rate for each subscriber to all other local subscribers would consist of 900,000,000 items. Assuming 100,000 entries to a volume, this would call for 9,000 volumes, which would have to be consulted for each of the 250,000 daily calls. Eight thousand new stations are conected annually and 6,000 old stations disconnected. The new stations connected would require 480,000,000 entries; the old stations disconnected would call for 360,000,000 entries.

But that's not all, says Mr. Swayze. Each time a subscriber changed his address there would have to be 60,000 entries made. To do this work, Mr. Swayze estimates, would require the services of 250 clerks, making 1,000 entries a day.

In conclusion, Mr. Swayze says the air-line rate would necessitate the employment of 800 clerks, each capable of making 2,000 entries a day to keep the record up to date.

Queries on Theory and Practice

Trouble on a Long Line.

"We have a line 26 miles long with a branch five miles long, of No. 12 B. B. iron wire, as shown in the diagram. At *A* the line is on an open jack on the switchboard with a 2,500-ohm bell bridged across the line. At *B* the line is on an open jack on the switchboard with a 1,600-ohm bell in series with 2 mf. condenser bridged across the line. At *C*, a toll station, there is a ½ mf. condenser in series with the receiver on the telephone and two 1,000-ohm bells connected in series, also in series with 2 mf. condenser bridged across the circuit. At *D*, the manager informs me, that there are two miles of cable No. 19 gage, .09 mf. capacity and the drop on switchboard is 1,000 ohms. We can talk over this line all right and we can ring *A*, *B*, and *C* all right. *D* can ring all the stations without trouble. All the stations can ring each other but we have trouble in ringing *D*. At times none of us can ring *D*. At times, *A* and *B* have to call *C* and they can ring *D*. At such times we get the ring at *A* good and strong when *C* is ringing *D*. We have taken an 80-ohm drop and put it on the line at the branch to *C* and we can throw the drop when ringing from *A* or *B*.

We have been all over the line between *A* and the test pole where our part ends. We trimmed the trees and inspected the line and it seems to be in good shape with the exception of one-half mile that has a good many joints in it. We are not certain that they are all soldered, but, as the wire is new, that should not make any great difference. The wire chief at *D* says that their part is all right to the toll station at *C*. At times, I cannot throw the drop at *D* when ringing with 200 volts and none of the time do they get the ring from *A* to *D* at all good. We have not been able to

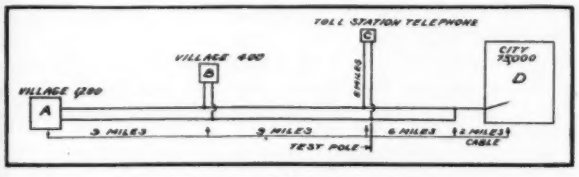


Diagram of Line Layout.

find this trouble. All of the tests that I have made show the line to be normal. The wire chief at *D* says that there is some ground on the line, but I have investigated and find that it is distributed all along the line and is only the leakage through the insulation. We were able to ring *D* with more of that trouble on the line than is present now with our ordinary ringing current of about 75 volts. Could you suggest anything that might be the cause? All the bells and drops have been inspected many times, so I do not think they are at fault."

Your condition is at least in part caused by the lack of sensibility which a drop possesses in comparison to a bell. It is very likely that if you were to replace the drop at *D* with a bell, you would be able to ring the station all right. The two miles of No. 19 gage cable at *D* should not interfere with your ringing. The 26 miles of No. 12 BB iron metallic circuit will have about 1,700 or 1,800 ohms resistance. The two miles of cable will not be over 190 ohms. As far as resistance goes, the cable is of little importance. It will add a capacity of 0.18 mf. across the line, but this is not enough to cause appreciable ringing trouble.

In addition to replacing the drop with a more sensitive line signal, the leakage should be investigated carefully. Even if it is distributed, it will cause trouble if heavy enough. You ought to have ten megohms per mile on such a circuit, making a total insulation resistance from one wire to the other of about 400,000 ohms. If this is true, and the joints to which you refer are good, you should have no trouble.

Phantoming a Farm Line.

"We have one farm line and one resort line. In the summer time, the resort line is overloaded and we want to phantom one of the busiest stations on this line on the farm line. We have had no experience in phantom work and therefore would be grateful for any information you can give us. We have on hand one duplex set which we have never used. I do not know what the resistance of the windings are but there are five terminals in all in each set and a rheostat for balancing mounted on box."

From your description, we take it that the conditions are as shown in Fig. 1. On the resort line the telephones are grouped

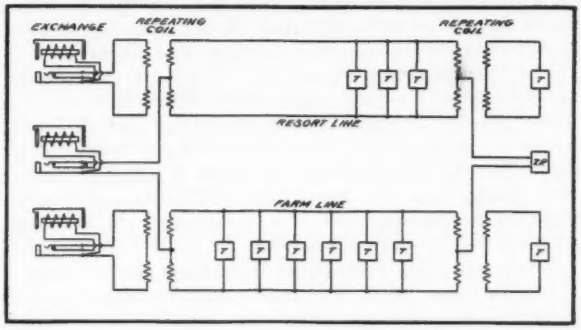


Fig. 1. Rural Phantom Circuit.

at the far end, while there is more even distribution on the farm line. It will take four repeating coils to bring in the busy resort telephone, *TP*, as a metallic phantom.

If you can not use four repeating coils but must bring the telephone, *TP*, in as a grounded phantom, it may be done as in Fig. 2. You can use the resort line for this purpose, since the two will not interfere with one another.

If both lines (resort line and farm line) are single wire, earth return, you can not get the results which you want. Out of the two wires, you can get only two circuits.

The connections of the phantom repeating coil are shown in Fig. 3, except that the numbering of the terminals may not

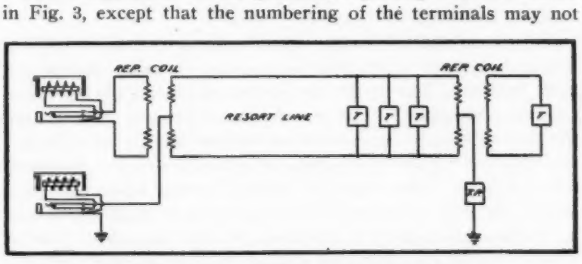


Fig. 2. Ground Return Phantom Circuit.

be the same as those on your sets. Terminals 1 and 2 must test clear of the others and should be wired to the switchboard. Terminals 3 to 4 should test equal in resistance to 4 to 5. Either 3 to 4 or 4 to 5 should test up half the resistance of 3 to 5. 3 and 5 must be wired to the line, and

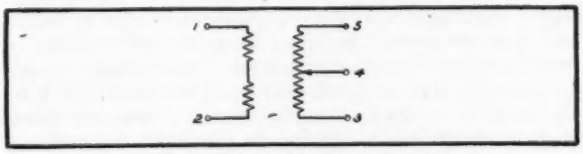


Fig. 3. Phantom Repeating Coil.

4 to the phantom circuit drop and jack on the switchboard.

Be careful to have your line joints good, and the insulation high also. If the line wires of the physical circuit are equal in resistance and have no high resistance joints, you should be able to put in a good phantom.

Railway Telephony—Practical Points in All Branches

A Regular Department Which Appears Semi-Monthly—Scope Includes Principles of Construction, Testing, Operation and Maintenance—Columns Open for Contributions on Matters of General Interest to Those Engaged in This Branch of Telephony

The Co-operation Factor in Telephone Train Dispatching.

By John A. Kick.

Telephone train dispatching circuits have been described in technical and untechnical talks, but little has been said about one of the more important factors, namely, co-operation between the dispatcher, operators and trainmen.

The telegraph train dispatching circuit prevents the dispatcher from communicating direct with trainmen, thus giving rise to repeated misunderstandings and ill feeling between dispatcher and trainmen, leading to contempt for each other, and, in rare cases, resulting in personal encounter. Regardless of the seriousness of the personal disagreements, the unfailing result is a lowering of efficiency, due to the failure to fully co-operate.

Telegraph operators frequently mistake the meaning of a well intended order or question from the dispatcher, by reason of the absence of any tonal inflection which might betray the temper of the party talking. Imagine the dispatcher in ill humor, due to a three or four hours' succession of vexing delays, add to that one of the many ills the human being is heir to, and his "Morse" talk may become crisp. The result follows that every man on the division is peeved.

The better the feeling between dispatcher and operators, the higher the efficiency, as the operators not only freely and fully answer all questions, but voluntarily give valuable information unsolicited. Trainmen are one step removed from the dispatcher by the use of telegraph, and thus in a position for greater cause of misunderstanding due to the intermediary not always correctly interpreting and transmitting information between them.

As an operator, I have, myself, been asked to tell the dispatcher what some irate conductor thought of him and how he would like to do him personal violence. My stereotyped reply was: "Put that in the form of a message and then I will have to send it, otherwise not." Such a procedure would mean the discharge of the trainman, otherwise the operator, if the trainman denied having made the statement. It may be added that I never sent such a message.

A dispatcher has a continuous mental picture of the division and the position of every train on it, and added to this, a store of information as to exact conditions at and between all stations. A trainman sees only his string of cars and can conceive of no results except those which have to do directly with this one train. Hence, his unvarying criticism of the work of the man who has definite and complete information right up to the minute.

Friction between dispatcher and trainmen is in evidence where telegraph is used to dispatch trains, by reason of the trainmen being unable to learn the full meaning of movements that favor other trains. The dispatcher is too busy on the slow operating circuit to take time to telegraph an explanation, which, at the best would be only a courtesy, and not recognized as a right. By telephone the train conductor can talk to the dispatcher, and in one minute has the situation cleared to him and he feels better toward the dispatcher, fully satisfied that he is receiving a fair deal. In turn he helps the dispatcher at every opportunity.

I have personally been present, when on a single track, a blockade was created by trainmen refusing to move, claiming rights on flimsy technicalities, worrying the dispatcher, demanding orders and messages to move, and then refusing to obey by squabbling over seeming rights and irregular forms. It can be said that trainmen are close students of train rules and can readily quote and interpret rules to fit their case. No one should understand that the trainmen are purposely failing to co-operate, but are just fulfilling their part of a natural condition produced by their being so far removed from the dispatcher by the telegraphic train directory method.

Just the opposite applies by telephone train dispatching. It can be noted that the dispatcher readily recognizes the voice of conducor and engineman; calls them by their first names as they do him and, in fact, they are real pals. When the dispatcher and operators change tricks, the new force exchanges greetings over the dispatching circuit on the first opportunity, and the team work between dispatcher, operators, and trainmen is of the very best.

Co-operation by telegraph, and especially on busy circuits, was rare, partly by choice, and partly by press of more important business crowding out many minor details which are after all of great assistance to the dispatcher.

By telephone train dispatching, every one co-operates for the reason that the dispatcher gets on speaking acquaintance with every man on the division, including section foremen who often personally explain to him their work for the day, and receive first hand information which allows them to plan rail and tie replacements without delaying trains.

Portable and outlying telephones are used by wreckers, signal, and track repairers, and in a very short time a very close bond of friendship is created between the now good-tempered, affable dispatcher and the division forces.

Telephone dispatchers go home care free and happy, instead of in a tired and mentally depressed state, as was the rule with telegraph train dispatchers. One dispatcher of 25 years' telegraph experience, who was a physical and nervous wreck, recently told me that the transformation to telephone dispatching had made him a boy again, and his appearance bears out his statement. From being a confirmed grouch and ineffective dispatcher, he has taken his place as one of the premiers of the business, and in fact his long experience, in addition to the improved methods, has made him 100 per cent. better than ever.

The most difficult task in connection with telephone train dispatching is to fix a value for comparison between the old and the new method. Converts to the new system say at least a 50 per cent. improvement has been made, but I believe it is better stated by saying the improvement is represented in the difference between full co-operation by the new method and entire lack of it by the old.

In the foregoing I do not wish to appear to criticise or question anyone's loyalty, but to attempt to bring out the fact that dispatchers, operators, and trainmen were victims of conditions created by the old system, and entirely transformed by the new.

The Use of The Slide Rule.

By J. M. Grigg.

There are many telegraph and telephone engineers who are unaware of the value of the slide rule in various phases of their work. Those who have considerable calculation

to do will find, a great saving in time and mental strain by its proper use. The slide rule is of valuable assistance in the preparation of estimates, checking reports, and all engineering calculations such as electrical measurements, wiring calculations, and proportioning dispatching circuits, etc. In fact, nearly any one who can use a slide rule, will find a use for it.

Probably a great many imagine that no one less than a person skilled in mathematics can use a slide rule. The slide rule is simple to learn, yet many fail. They can use a slide rule after a fashion, but have to make a rough calculation, mentally or otherwise, in order to fix the decimal place. In consequence they have become discouraged or dissatisfied with the rule, and either regard it as impractical, or feel that its usefulness lies without the pale of their accomplishments.

On the other hand, there are masters of the slide rule, to whom it is a useful and necessary adjunct in their daily work. For them the various arithmetical calculations that are ordinarily so tedious, are shortened and handled with an ease which makes the slide rule of indispensable service.

Of course the slide rule has its limitations. There are certain requirements for which it is not sufficiently accurate but such cases are few. With ordinary care the error should be less than one per cent., which is precise enough for nearly every purpose.

Any one of ordinary education can become proficient with the slide rule, and it does not require much patience or practice if the proper course is followed. By far the greatest value of the instrument is its adaptability to multiplication and division and the greatest difficulty the student meets is that of pointing off the result. It is not the purpose of this article to enter into the theory of the slide rule, or its operation, but to merely illustrate a simple means of figuring the decimal place, which it is thought is the one obstacle that blocks the progress of so many.

The following briefly illustrates a method that can be depended upon, if followed implicitly.

Consider for this explanation the upper half of the slide rule only. Here any combination of integral numbers whose product does not exceed 100 can be multiplied and the result read directly. Now suppose that two numbers, say 9 and 12 be multiplied by setting the slide to 9 on the rule and moving the cursor to 1.2. The product read is 10.8. By reason alone the product is 108 because the decimal point was moved to the left one place in the 12, and therefore must be put back in the final result.

Herein lies the secret: Let the operator mentally move the decimal point to the right of the first significant figure on the left, in each number, and use that new number literally on the scale, and account for the changes in the final result. This can be done by balancing up the "add" and "subtract" decimal places. The following table illustrates these changes for typical numbers.

Number			
Numerator	Denominator	Add	Subtract
10		1	
100		2	
	10		1
	100		2
0.1			1
0.01			2
	0.1	1	
	0.01	2	

Moreover, every step in the manipulation for which a setting is made with the right hand end of the slide must be remembered and accounted for in pointing off the result. If the step be multiplication, two will be added to and if division two subtracted from the movements of the decimal point, when the upper scale of the rule is used. Using the lower scale it will be the addition or subtraction of one in multiplication and division, respectively.

Therefore to fix the decimal place in the result, it will be only necessary to take the difference between the total plus and minus movements, including those due to settings with the right hand end of the slide, and move the decimal point that number to the right for a plus, or to the left for a minus balance of an imaginary decimal point between the first two fingers of the literal result.

The following example serves to illustrate the method.

$$\frac{17 \times .03 \times 30}{51 \times .06 \times 100}$$

$$\frac{1.7 \times 3.0 \times 3.0}{5.1 \times 6.0 \times 1.0} = 5 \text{ (using lower scale).}$$

Then $1+1+2-2-1-2-1=-2$

whence, $\frac{17 \times 0.3 \times 30}{51 \times .06 \times 100} = .05$ answer.

The foregoing method will soon enable the student to fix the decimal point mentally, and practice leads to proficiency.

Frost Fighting in Oregon Orchards Directed by Telephone.

When the apple and pear orchards of Oregon are in bloom the utmost vigilance is often necessary to save the crop from the blighting effect of a frost, such as is not infrequently experienced at this time in the Rogue River Valley. It has been found that by using 75 to 150 smudge pots per acre for about four hours during any night when there is a frost the danger to the crop may be averted.

Frost fighting in the Rogue River Valley is done in a systematic manner under the direction of Prof. O'Gara head of the weather bureau at Medford, who acts, says the Seattle Post Intelligencer, as commander-in-chief. Under him are six other commanders stationed in different portions of the valley each with a telephone at hand ready to answer questions, advise, and see that no indifferent rancher is caught napping. In addition to this the young women who operate the telephone exchange inform inquiring subscribers of frost conditions so that there is no excuse for frost troubles through ignorance of conditions.

Prof. O'Gara sits in his conning tower at Medford with the weather appliances at one hand and the telephone at the other and directs the battle. When the mercury in the tube gets below 30 above he passes out the word to get ready, and just before 28 is reached the command of "fire" is given. At such a time the wakeful rancher on the foothills, protected by the altitude from danger, might see a thousand twinkling lights suddenly flash up along the floor like distant fireflies until the sun peeps over the hills and the day dawns.

As there are rarely more than three nights a season when the smudging has to be carried on, and as this method of frost-fighting has practically eliminated loss during the blooming season from low temperature, smudging pots have become as much a part of the fruit growers' equipment as spray pumps and pruning shears.

It is estimated that it costs $1,000 on hour to fight a night frost in the Rogue River Valley but the protection of a $1,000,000 crop is well worth the outlay.

Induction as Affecting Telephone and Telegraph Lines

Theory of Induction and, Possibilities of Inductive Disturbances—Conditions Likely to Cause Trouble and Means for Preventing or Resisting Inductive Effects—Paper Presented at Annual Meeting of Association of Telegraph Superintendents

By P. J. Howe

Induction is the phenomenon by which an electric current or potential in a conductor will cause an electromotive force to be established in a neighboring conductor. The energy is transmitted through the surrounding medium, which is stressed or energized by the originating current. For this reason, induction in some form is interlinked with all electrical circuits. The form of induction with which this paper deals is the induction which occurs in a wire that runs parallel to an energized circuit. Theoretically, every energized conductor will induce an electromotive force in every paralleling wire. The induced voltage, however, rapidly diminishes at increasing distances. It also depends on and is proportional to the energy transmitted. Therefore, the greatest inductive effects occur on wires which closely parallel circuits that transmit a large amount of energy.

Inductive disturbances may be defined as inductive effects which interfere with the normal operation of circuits. The small, weak currents in a telephone or telegraph circuit will induce voltages in a power wire, just as surely as the power circuit will induce voltages in it. But on account of the small energy in the signaling circuit, the induction from it will be small and infinitesimal compared with the large energy of the power circuit. The effect of the power circuit, however, may be very considerable and may be large in comparison with the small currents and sensitive apparatus used for the telephone and telegraph.

The purpose of this paper is to call attention to the possibilities of inductive disturbances in telephone and telegraph lines and to describe the manner in which these disturbances take place. The conditions which are liable to cause trouble will be discussed and also various arrangements of circuits or apparatus which will either prevent or restrict the inductive effects.

The electric transmission and railway industries have grown very rapidly during the last 10 or 15 years. The number of lines has been multiplied, the circuits have been lengthened, the voltages raised, and the amounts of energy transmitted increased. Single phase alternating current has been applied to electric railway operation and is being rapidly extended. At the same time nearly every important extension of the alternating current electrical industry has brought its harvest of induction troubles for the telephone and telegraph engineers. The future does not hold out any promise of less interference for them. Instead, it indicates that the electrical industries will advance even more rapidly than in the past. Therefore, the telephone and telegraph companies must face the problem of an ever increasing number of "inductive disturbances" on their lines.

Location of Power Lines.

The business of power transmission and interurban electric railway companies is to transmit power or provide transportation from one point to another. The precise route of their lines is not of great importance, except as a matter of economy. Recent years, however, have seen a tendency for power and electric railway engineers to locate their lines on or close to railroad rights of way. Some of the reasons, which may argue for this choice of location, are the most direct route, cheaper right of way, cheaper maintenance of lines, and less public opposition than if the lines were built along public highways or through private property.

On the other hand, most telegraph lines and many telephone lines are either close to or on railroad rights of way. The operation of a closely paralleling high tension transmission line or alternating current electric railway is almost certain to have inductive effects on the telephone and telegraph wires. In some cases this induction will cause disturbances that will work a real hardship on the company operating such lines.

Another source of trouble is the hazard of life and property that is often created by the erection of high tension lines so close to telephone or telegraph lines and railroads, that there is a possibility of physical contact with the high tension wires. For these reasons, the location of power lines and electric railways close to railroad rights of way is very objectionable to the telegraph company. It should also be so considered by the railroad companies which have their own telephone and telegraph systems to maintain. If, therefore, the position of the telegraph company is properly presented to a power or electric railway company before its right of way is secured, it will often be found practicable to locate the line where it will not be unsatisfactory to the telegraph company, and thus to avoid all the trouble which might otherwise be caused.

Electromagnetic and Electrostatic Induction.

Inductive disturbances are the result of two different phenomena, electromagnetic and electrostatic induction. Both effects may be present on a circuit and nearly equal, although it is more usual to find one effect stronger than the other. In order to better explain the various methods of overcoming these inductive effects, a brief outline of the theory of induction will be given. No attempt will be made to derive or state the mathematical formulæ by which induction may be calculated, as it is desired only to explain the factors of induction in such a way that the result of any changes in a disturbed or disturbing system may be approximately foretold.

When an electric current flows in a conductor, there is set up a magnetic flux or field in the region surrounding the conductor. This field is considered as composed of circular lines of force surrounding the wire. These lines change with every change of current, expanding when the current increases and contracting when it decreases. If a second conductor is placed in parallel relation with the energized circuit, every change in the field of the first conductor will cause the field to cut across the second conductor. It is this cutting of a conductor by magnetic lines of force that induces an electromotive force in it and gives rise to electromagnetic induction. The more intense the magnetic field and the more rapid its rate of change, just that much greater will be its effect on other conductors.

The strength of the magnetic field surrounding a conductor is directly proportional to the current. When the current is alternating, the field goes through a complete cycle of changes with every cycle of current. The rate of change of the field intensity is proportional to the frequency, and is affected to a certain extent by the wave form. The strength or density of a magnetic field is the greatest at the surface of a conductor, and at more distant points varies inversely as the distance from the center of the conductor. The voltage induced in a

paralleling wire depends upon the field strength, which is proportional to the current, and upon the frequency, the length of exposure and the separation. The effect of separation varies with the logarithm of the distance.

When there are two disturbing wires carrying equal currents

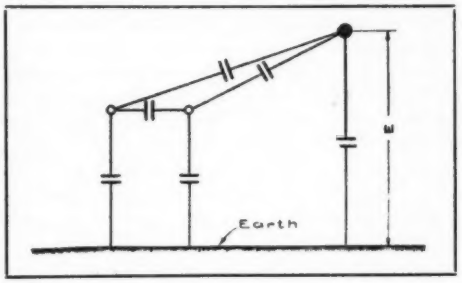


Fig. 1. Capacities Between Line Wires.

but in opposite directions, the magnetic field surrounding one of the wires will be in the opposite direction to that surrounding the other. These opposing fields result in more or less neutralization of the induction in other wires, the neutralization being more complete as the two conductors come closer together. In this way there is always a certain amount of neutralization of the induction from metallic alternating current circuits.

Considered electrically, any two wires, which are supported in the air and insulated from each other and the earth, may be regarded as two plates of a condenser. Air is the dielectric or insulating medium. Similarly, each wire forms one side of a condenser, of which the ground is the other side. When, therefore, an electromotive force is applied to one of several wires, as shown in Fig. 1, the difference in potential between that wire and ground will cause an electrostatic charge to be induced on the other wires. If the source of energy changes, or reverses, as in the case of an alternating current, the charges induced in the other wires will change accordingly. Every reversal of the disturbing voltage will cause a similar reversal in sign of the induced charges. It is the flow of current resulting from these changes in static charges that gives rise to what is called a charging current, the cause of electrostatic disturbances.

The electrostatic charge on a conductor varies directly with the voltage applied to the disturbing wire. The potential of the charge depends on the ratio of the wire's respective capacities to the disturbing wire and to earth. The magnitude of the charging currents, however, depends on this potential, and also on the magnitude of these capacities or condensers. By reason of these facts, the static potential induced in a conductor is independent of the length of exposure, assuming perfect insulation, while the charging currents and therefore the disturbances, vary directly with the length of exposure. Static disturbances also vary with the frequency of the disturbing source, being much greater when the applied voltage is of high frequency or contains several high frequency components.

Just as magnetic induction is neutralized by equal and opposite currents in wires that are near together, so is static induction neutralized when there are two disturbing wires having equal but opposite potentials to earth. In this case, the charge induced by one wire is opposite to that induced by the other, the completeness of the neutralization depending on the closeness together of the disturbing wires, compared with their separation from the disturbed wires.

It has been shown, in the above, that electrostatic induction depends largely on the capacities which conductors have to each other and to ground. Every conductor, however, has a capacity to every other conductor and structure. Therefore, the capacity between any two wires, or between any wire and ground, depends to a certain extent on the other conductors in the near vicinity. Thus the addition or removal of a wire on a line, or the grounding of a circuit, may have an effect on the capacities of certain other wires. As a result of these conditions, it is very difficult to determine in advance of actual operation how much static interference will be caused by any particular power installation. It may be stated, however, that the presence of grounded telegraph circuits on a line will tend to reduce the static disturbances on the other wires. Static disturbances on wires of a line carrying many conductors will also be less than on wires which have only a few neighboring conductors. In the case of a heavy line, the static charges are probably distributed among the several conductors.

From a consideration of the foregoing discussion, it is possible to draw the following conclusions regarding the characteristics of electrostatic and electromagnetic induction, and their differences:

Electromagnetic induction varies with the current and therefore with the load; electrostatic induction is practically independent of the load.

Electrostatic induction is proportional to the voltage; electromagnetic induction is unaffected by the voltage.

Both magnetic and static disturbances vary with the frequency and wave form.

Voltages induced by magnetic effects are proportional to the length of exposure, static "potentials" are independent of length.

Static "disturbances" are proportional to the length of exposure; magnetic effects vary practically with the length of the exposure, except when the impedance of the exposed section of a circuit is a large part of its total impedance. In the latter case, both the induced voltage and the line impedance will vary with the length, and the induced "current" will be largely independent of length of exposure.

Currrent from magnetic induction is practically the same in all parts of an exposed circuit; current from static induction is different in different parts.

Static disturbances are less when there are many wires on the disturbed line, and may be entirely prevented by shielding with a grounded sheath; magnetic effects are practically unaffected by the near presence of other conductors.

Telephone and Telegraph Systems.

Most of you are very familiar with the principles of the telephone and telegraph, and with the systems that are in more or less universal use on the railroad lines of this country. Therefore, it is unnecessary to describe the details of this branch of the subject. A general description of the usual systems will be given, however, so that any who may not be well acquainted with the telephone or telegraph operation may better understand the manner in which inductive disturbances take place and the methods by which they may sometimes be overcome.

In country districts where the electric power and railway industries have not been established, and where the requirements of the service are not exacting, telephone circuits are sometimes operated with a single conductor and earth return. But these systems rarely exist in localities where induction is liable to be encountered, and therefore will not be further considered in this paper.

The standard telephone system comprises two-wire metallic circuits with the telephone instruments bridged across the circuit. The two sides of a circuit have practically equal resistance, capacity and insulation, so that both wires will be equally subject to outside influences. Thus there will be no tendency for an outside or foreign current to flow from one side to the other and make the telephones noisy. To still further "balance" the circuits against outside effects and to prevent "cross-

talk" or "over-hearing," the two wires of a circuit are usually transposed at regular intervals. That is, their pin positions on a pole line are interchanged.

There are two broad types of telephone systems, the magneto or local battery and the common battery. As its name implies, the local battery system has its current supplied at many points, each transmitting station having its own supply of energy. In the common battery system, all energy is supplied from the central office. In either system, the current in the local circuits consists of a small, high frequency alternating current superimposed on a direct current. When used for "toll" or long distance work, the direct current is eliminated by repeating coils or condensers, and only alternating current flows in the line. For the purposes of this paper, therefore, the two systems are identical and need not be considered separately.

The frequency of telephone currents is variable, about 800 cycles per second being generally regarded as a fair average value. The human ear, however, is not very sensitive to low frequencies, such as from 25 up to 60 cycles. Therefore, a comparatively large current of low frequency may exist in a telephone circuit without greatly influencing its efficiency. But if the frequency of a foreign current is anywhere near that of the telephone currents, this current may be very small and still be strong enough to cause serious disturbances.

During recent years, the phantom telephone circuit has been introduced into many telephone systems. A phantom circuit is a third telephone circuit obtained from two pairs of wires. It is essentially a four-wire circuit, using two wires in parallel for each side. Each of two adjacent telephone circuits on a pole line is provided with a neutral point at each end by means of a bridged retardation coil or a repeating coil having a tap in the middle of its line side. These two neutrals at each end of the circuits are then used as terminals for the phantom circuit and equipped with telephone apparatus in the usual manner.

In order to obtain a quiet phantom and to prevent cross-talk, the two pairs of a phantom circuit must be frequently transposed or interchanged, just as any two-wire circuits must be transposed. In considering induction, the problem presented by a phantom circuit is practically the same as that by any other telephone circuit, except it is a more difficult one. On account of there being four wires, separated quite a distance from each other, the possibility of unbalances and noises is much greater than on a two-wire circuit. Therefore, it is sometimes very difficult to obtain a quiet phantom telephone circuit when inductive influences are present.

Practically all telegraph systems use a single conductor with earth return. The usual circuits consist of relays and keys in series with the line and a battery at each end. Stations may be as many as consistent with satisfactory operation of the circuit and may be located at any point in the line. Signals are transmitted by interrupting the line current, which always flows in one direction.

Another type of circuit which is largely used is the duplex, by which two messages may be transmitted simultaneously, one in each direction. The duplex telegraph uses reversals of current, positive and negative impulses being alternately sent out on the line from either end. The duplex feature is obtained by providing a split in the circuit between the "transmitting" or "pole changing" relay and line. One branch of the split goes to the line and the other to an artificial line, which is adjusted so as to have practically the same constants as the real line. The receiving relay is connected in circuit with the real and artificial lines in such a way that it will not be affected by the outgoing currents, but will be operated by changes in line potential at the distant end. There are two general ways of connecting the receiving relays into circuit. One, known as the differential method, uses a polarized, differential relay, having one winding in the real line and one in the artificial line. The other, known as the bridge system, uses an impedance in each leg at the split in the circuit, and a polarized relay connected between the real and artificial lines, in a typical bridge arrangement.

Not all telegraph circuits are operated by hand sending. There are several types of high speed, automatic printing telegraphs, such as the Wheatstone system and the Barclay printer. Most of these systems are operated over a duplex circuit. They consist principally of an automatic transmitter, operated by a perforated tape or typewriter keyboard arrangement, and of a receiving device for recording the incoming signals, either as dots and dashes or in regular typewritten form. On account of the high speeds at which the automatic systems are operated, the various transmitting and receiving relays are much more delicate and sensitive than those used in manually operated systems.

The quadruplex telegraph, by which two messages may be sent in each direction simultaneously, is a modification of the duplex. The quadruplex feature is obtained by varying the strength of the current and using a second receiving relay which operates on changes in current. This "neutral" relay, as it is called, is not affected by changes of polarity, but will operate whenever the current through it increases or decreases beyond a certain strength. The minimum current, however, must at all times be strong enough to operate the regular polar relay of the duplex circuit.

A telegraph circuit operates on a larger current than a telephone circuit and therefore will be less influenced by disturbances from induction. On the other hand, a telephone circuit contains two wires and can be balanced up so as to partly neutralize any induction which it may be subject to. But a telegraph circuit is grounded and cannot be transposed or otherwise balanced against induction. For this reason the only methods of overcoming inductive disturbances on a telegraph circuit are to either remove the cause, neutralize the effect on the terminal apparatus, or to introduce other currents which will oppose and neutralize the disturbing currents.

(*To be continued.*)

Voice Culture for St. Paul Exchange Operators.

Standardization of phrases and proper enunciation of words and numbers are demanded of the St. Paul, Minn., exchange operators of the Northwestern Telephone Co., says a writer in the St. Paul Pioneer Press.

In order that these accomplishments may be acquired, the girls, both those in training and those who have been in the company's employ for some time, are given a course in voice culture as exacting as those of schools of elocution and art.

The girls' voices must be not only well modulated but they must be pitched at the right tone to carry through the instruments. Special stress is laid, in this training course, on the enunciation of numbers. The phonetic sound of all numbers is used and the operators are trained to pronounce them with the rising crescendo that practically insures their understanding by the patrons of the telephone company.

For several months the operators have been studying and practicing both phonetic numbers and the rising crescendo. St. Paul was among the first cities to specialize in this branch of telephone service.

The ban has been declared on slurred numbers and it must now be "wun," "tu," "t'haree," "fore" and so on that come over the wire from the lips of the young woman "operator." According to Mr. Bush, it is harder for the older operators to perfect themselves in the use of the new system.

Standardization of stock phrases, "line busy," "out of orter" and technical terms used in obtaining connections between exchanges, also has been made part of the new courses Proper articulation and enunciation of the phrases are insisted on.

The Telephone Operator—Her Relation To The Public

An Essential Factor in the Industry—A Bureau of Information for the Public—Courageous in Time of Disaster—An Experience with a Typical "Kicker"—Patron's Manner in Use of Telephone—An Address Delivered at North Dakota Convention

By Eva McReady

The telephone is the open door of practically all human activity, commercial or social, and the telephone operator is one of the most essential actors connected with the system.

The telephone subscriber regards an operator as an ever available bureau of information, as to fire reports, train reports, time of day, election returns, prize fight reports, baseball and football returns, correct historical dates, weather reports, morning rising calls, etc.

Demands on Operator in Case of Fire.

A fire rush is a very common occurrence and means a hard and nervous strain for each operator. She answers not only her regular calls but practically all subscribers who have heard the alarm. A subscriber, asking "Where is the fire?" always asks in a hurry and is usually excited. Invariably an operator will repeat the location two or three times before he understands. She notifies all volunteers; in fact, she is the first volunteer and aid to a fire in a small town.

If the public could be present in an operating room and witness a rush that has taken place during a fire, the complaints would be greatly reduced. This remark, "I'll never be cross or impatient with central again; I have never realized what her duties really were, how confining and nerve straining," has frequently been heard after a visitor has watched the girls operating only a few moments.

"Is the train on time?" is a question asked 25 to 50 times an hour. A subscriber receives a train report inside of five seconds from the time he takes the receiver down. How many seconds, or minutes I might say, would it take if an operator connected him with the depot? And still the subscriber or agent does not fully appreciate what a great help she is for both.

Agents have often asked the operator not to bother them again, as they had given a report, when it is only her object to verify the report given.

Correct time is another accommodation. No one is absolutely sure of one's clocks or watches when there is a telephone handy. Punctuality is very important universally. "The time, please?" means that the traveling man may miss his train, the working man may lose his position, or the doctor's orders for his patient may be neglected.

Election returns, prize fights and baseball reports, etc., are given out with but little delay and are distributed hundreds of miles in a few minutes.

In smaller exchanges an operator is used for an office girl for the public. For instance, doctors and business men call and ask her to please notify the people. when they call, to call such and such a place, or tell them they will be back in a certain time.

Questions of all sorts are asked daily, such as, "Is it cold today? Had I better discard my furs? Do you think it will rain today? Why is the flag on the school house? Is the post office open now?" and dozens of other questions that an operator is expected to answer.

A man called an operator with despair in his voice, and said: "My wife has gone out leaving me to cook the spinach, how long shall I cook it?"

One day a lady wheeled a baby buggy to the telephone and asked central if she would call her at a certain number if the baby cried. If the operator refused, this same lady would probably say she was getting poor service.

A plucky telephone girl prevented three safe blowers from robbing a bank. The men used nitro-glycerin and the explosion blew the receiver off the hook and signaled the operator. She answered the signal and, hearing a muffled sound, glanced out of the window. Seeing three men in front of the bank, she notified the town marshal.

Five hundred dollars was awarded to an operator for staying at her post during a flood and warning the town of the danger, until the water compelled her to leave the switchboard.

On July 4, 1911, at Grand Forks, N. D., a heavy hail and wind storm struck the town. Since it was a holiday, the operating force was limited. Inside of one half hour, two or three operators left their homes during the heavy downpour and reported for duty knowing it would be impossible to handle the traffic with a reduced force.

In this same exchange when the fire whistle blew, the operators off duty showed their faithfulness by running to the exchange instead of to the fire.

To other than a telephone employe, it is just as natural to complain about telephone service as to breathe. Just a short time ago a non-subscriber, after being informed I was connected with the telephone company, complained of not getting good long distance service, and said the same day he had waited nearly an hour for a station only 100 miles distant; also, the day before, he experienced the same trouble, waiting over half an hour. After making a few inquiries, I concluded that he was what we call a crank or a kicker. I asked him what time he placed his call, from what number, station name, etc. He didn't seem to want to give me the required information, and said: "Oh, never mind, I don't want to trouble you." On looking up his calls I found that the call he claimed was delayed nearly an hour, had been recorded and completed within eight minutes, the recording time corresponding with the time he placed the call. The call that was delayed over half an hour, according to his statement, was just 13 minutes from recording time to completion, the delay being due to no circuits available.

There is probably no condition under which people so readily show their real character as in their use of the telephone. Compare a telephone operator with a clerk in a store. Would a man, even if a clerk were not busy and she had not given him her attention at first, ask her if she were asleep, not attending to business, or visiting with her neighbors? This is what an operator is accused of, time and time again. No public service corporation employe has more to contend with.

Value of a Well Modulated Voice.

A subscriber's first impression is formed from the tone of voice and the way an operator says, "number." It should be with a rising inflection, soft and pleasant. A well modulated voice disarms anger and establishes unconsciously a cordial relation with the public, and is of great value to a company, in fact, one of its greatest boosters. Every operating official knows the operator who is courteous and patient, and it means promotion for her. The operator that does the work is really great.

Each year we find new and broader uses for the telephone, and the public is too little aware of the debt they owe to the telephone operator for the important part she plays in the use of this modern convenience.

Sparks from the Troubleman's Department

Telephone Girls.

If a man is really looking for a wife instead of a social butterfly, an heiress or a chorus girl, we heartily recommend for his consideration a telephone girl. For even temper, patience, promptness and meekness, telephone girls have the world beaten. They are girls with practical ideas and common sense; they are girls who will help you save your money, and make you an all-round housewife. We have never seen one who wasn't neat and clean, and they would very probably be the most orderly housekeepers you could get. And one of their greatest virtues is their ability to control their tongues. They are accustomed to being quarreled at and bemeaned, yet they are not moved to an outburst thereby. We know they are sometimes imposed upon and are seldom rated at their real worth. If you are in need of a wife, get a telephone girl.—Hamilton Record.

It is probably all true, but couldn't you have summed it all up in the simple statement that the telephone girl is a good listener? To learn how not to do all the talking is splendid training for wifehood. And the telephone girl is taught from the very first day of her employment at the switchboard that her main duty is to make it convenient for other folks to talk while she maintains a passive disinterest in what they are saying. Sometimes she carries this faculty of disinterest to the extent of not listening to the numbers called off by busy subscribers, but as a general thing the telephone girl is all ears to listening and voiceless to conversation. But we don't know whether or not they carry the virtue of tonguelessness into the marriage state. It is possible that after one of them exchanges a good salary for a tolerably sorry husband she gradually regains her voice and charges the domestic atmosphere with vocal electricity. We don't know, but we've got a right to guess if we want to.—Dallas Morning News.

THE DEFINITION OF A FRIEND.

By Dr. Frank Crane.

What is a friend? I will tell you. It is a person with whom you dare to be yourself. Your soul can go naked with him. He seems to ask of you to put on nothing, only to be what you are. He does not want you to be better or worse When you are with him you feel as a prisoner feels who has been declared innocent. You do not have to be on your guard. You can say what you think, express what you feel. He is shocked at nothing, offended at nothing, so long as it is genuinely you. He understands those contradictions in your nature that lead others to misjudge you. With him you breathe freely. You can take off your coat and loosen your collar. You can avow your little vanities and envies and hates and vicious sparks, your meanness and absurdities, and in opening them up to him they are lost, dissolved in the white ocean of his loyalty. He understands. You do not have to be careful. You can abuse, neglect him, berate him. Best of all you can keep still with him. It makes no matter. He likes you. He is like fire, that purifies all you do. He is like water, that cleanses all you say. He is like wine, that warms you to the bone. He understands, he understands, he understands. You can weep with him, laugh with him, sin with him, pray with him. Through and underneath it all he sees, knows and loves you. A friend, I repeat, is the one with whom you dare to be yourself.

Why He Couldn't Pay His Bill.

A Pittsburgh subscriber of the Central District & Printing Telegraph Co., who was in arrears, wrote to the company explaining the circumstances. This is his letter, as printed in the Telephone News:

"Dear Sirs. this P. M. I will address you a few lines Inregards to my tellephone. I have Received the bills and I Received one to day. for $6.50. I received a Bill Aug. 1, 1912 for $—— that included the month of July for $—— & — centrs for Extra Call & $—— for month of August and — cents for Extra Calls. that $—— now I will state the Reason why I did not Come and Pay up as I have allways Done. I did not for get it. me and my Family left here on July the 5th and went Down to my mothers on ———— River, and was not going to be gone only 2 weeks. But I got Sick I think you Know about my sick spell I had last March when I lived on the ———— st. it was a Prornaine Poison spell of my stomic, and the Doctor said it would take Some time to Cure me sound But I was able to go to work in about six 6 weeks I keep taking a Little medicine from the Doctor while I was working and was not allowed to Eat any hog meat or any thing cooked with hog meat or seasoned with it nor any starchie foods, all I was alowed to Eat was toaste Poarched Eggs Roasted Potatoes and stake scraped and little Cakes made and fixed in Butter that was all I was allowed to Eat when I left heare. I felt good and I went to see the Doctor the day before I left and he said if I take Good Care of my self I wouldnt Kneed much more medicine. Well I went Down to my mothers she had lots of New fresh Vegiabels and Cooked some nice Green beans so I seen all This Good fresh stuff and felt Good so I went to Eating some Green Beans Cooked with hog meat and I eat some of the meat and Eat some Peaches. so in 5 days after I was there I taken sick with stomic, got out of my head and was unconious for 2 too weeks with 3 Doctors working with me. so we was gone a little over six 6 weeks we left heare July 5th and arived Back heare August 19th. thats why you did not get the Bill Paid so when I came back I was not able to Come to see you and Pay it. one of the letters said if it was not Paid soon the Phone would be cut off. I Could not Come so the Phone was Cut off last Friday one week ago. August 23rd so I Received another statement today for $6.50 Chargeing me for this month I cant understand that after cutting the phone off on the 23rd of last month and not been used since, and sending me a bill for $6.50 & chargeing me for this month.

"this is all. I don't expect you can read this for I am nevious yet. I will be able to go to work in about another week. I would Love to have this straitened up but Cant now for I havent the money I have some money in the Farmers Bank but in the Savings account so I haft to give 10 to 20 days notice before I can get any."

The telephone to some persons is still an unsolvable riddle. A Teuton called up a feed store.

"I vant two bags oats," he demanded.

"All right. Who is it?"

"Id's me," was the indignant reply.

"Well, who are the oats for?"

"For der horse; don't you ged so fr-resh," replied the wrathful would-be-customer.

Not at Home.

Mrs. Sam Cox answers the telephone—Hello?

Voice—Is this Sam Cox's residence?

Mrs. Sam Cox—No, this is his wife.

From Factory and Salesroom

Convention: Eastern Pennsylvania Independent Telephone Association, York, Pa., July 15 and 16

Addressing and Imprinting Equipment.

Telephone companies large and small will be interested in the progress which has been made in the development of machines for handling addressing, mailing and routine office records. The accompanying illustrations show some of the addressing and imprinting devices made by the Montague Mailing Machinery Co., Montague Block, Chattanooga, Tenn. This company manufactures an extensive assortment of machines from the small hand addresser to the large automatic publication mailer.

Fig. 1. Hand Addressor.

Fig. 2. Tag Addressor.

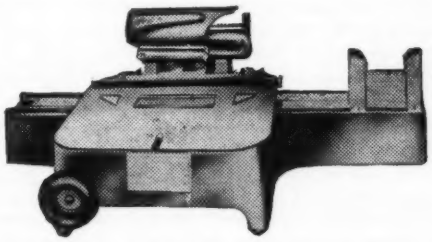


Fig. 3. Office Addressor and Imprinter.

Of the machines selected for illustration Fig. 1 shows a small and simply constructed machine equipped with a slide plate which operates by hand, each plate being placed in the machine singly. The printing is done from a typewriter ribbon. The index and printing plates are placed on the plate side with the type surface up and are thus carried under the ribbon. The envelopes or forms to be addressed or imprinted are placed over the ribbon against a guide and the impress is made by bringing the impression head down with the hand. The machine is used in addressing small mailing lists, daily correspondence, shipping tags, etc., and for imprinting names, addresses and other records on office, factory and sales forms. It is claimed that 300 to 500 addresses or imprints can be made per hour on this machine.

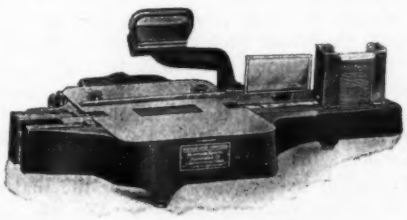


Fig. 4. Automatic Office Addressor.

With the tag addressor shown in Fig. 2 it is stated that tags, mail matter or forms handled singly, can be addressed at a speed of 500 to 700 per hour while many times this number can be put through when handled in gangs. The plates are placed in a depressed plate holder in the bed of the machine and the article to be addressed or imprinted is placed on the bed of the machine against a gauge. When impression head is brought down with the hand the plate automatically comes up underneath the ribbon making an impression from each plate.

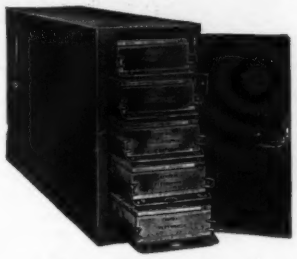


Fig. 6. Metal Cabinet.

The machine shown in Fig. 3 is suitable for all classes of addressing, and imprinting of names, addresses and other records on office, factory and sales forms and has a speed of 1,000 to 1,500 addresses or imprints per hour. In operating this efficient device the address plates are put in the hopper at the right of the machine 25 or 30 at a time, and after being carried to the printing point are discharged into a receiving hopper by turning the knob at the left and front of the machine. The impression head is brought down by hand by the operator, the imprint being made through a typewriter ribbon.

The machine shown in Fig. 4 is an automatic office addressor capable of making 1,500 to 2,000 imprints per hour.

The foot power commercial addressor shown in Fig. 5 is capable, it is said, of handling 2,000 to 3,000 addresses per hour. A speed of 3,000 to 4,000 imprints per hour may be made on a similar addressor driven by a. c. or d. c. motor.

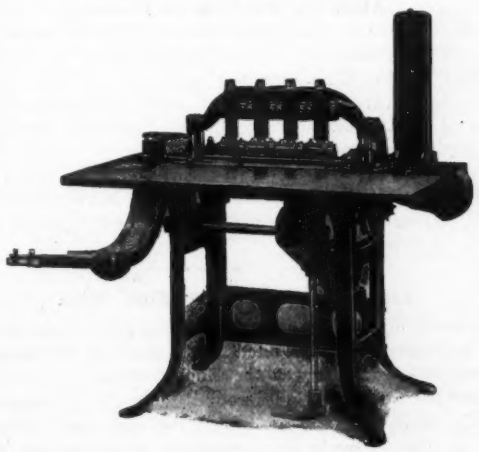


Fig. 5. Foot Power Commercial Addressor.

Some of the important telephone and public service corporations of the country have adopted the Montague system after a thorough test of the machine made by this company. The permanent plates used in this system elim-

inate errors in addressing and the fact that the different machines address and imprint from the same style of plate and ribbon permits the machines to be changed to meet changed conditions without affecting the investment in plates and filing equipment.

The plates used carry five lines of type of 26 letters

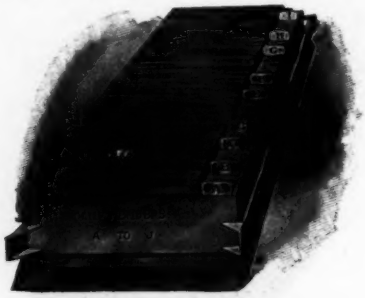


Fig. 7. Filing Drawer.

each, which can be embossed on the plates in any position desired. Records can be embossed over, underneath or at the sides of names and addresses, and all or part of the type embossed on the plates can be printed or omitted as desired. The plates can be filed alphabetically, numerically or in any manner, and thus furnish a perfect metal index

Fig. 8. Universal Index and Printing Plate.

file of all names, accounts or records used for reference purposes.

Figs. 6, 7 and 8 show respectively a metal cabinet, filing drawer, and universal index and printing plate.

Allen Co. Products in France.

L. B. Allen Co., Inc., 4517-4529 N. Lincoln street, Chicago, Ill., has received from L'Electro Material, exclusive handlers of the Allen line in France, some letters to that agency from various prominent French companies who are users of the Allen products. The Electrical Society of the Mediterranean, the Electrical Energy of the Mediterranean coast, both of Marseilles, and the Company of Electric Signals for Railroads, of Paris, have all used the Allen products for five or six years and express entire satisfaction with them.

Litigation as to Copper-Steel Wire.

Important litigation in regard to copper-steel wire which has been in progress in the United States court in Pittsburgh for the past 2½ years between the Duplex Metals Co., complainant, and the Standard Underground Cable Co., defendant, was partially decided on June 25 when the case came before the court on motion made by complainant to dismiss the bill in respect to patent infringement. The bill as orginally filed charged infringement of the patent and infringement of a trade mark. The motion made by complainant was to dismiss without prejudice; that is to say, a dismissal leaving the complainant in a position to renew the suit at its pleasure. The motion was opposed, defendant contending for a dismissal on the merits of the question. The court so ordered, the order reading:

"Complainant having admitted that defendant's product referred to in the proofs herein does not infringe the Monnot patent in suit No. 893932 it is ordered adjusted and decreed that the bill of complaint herein, in so far as it is based on alleged infringement of said patent, be, and the same hereby is dismissed on the ground that defendant has not infringed said patent."

The order of the court directs that the complainant pay the costs. The only portion of the suit not thus disposed of is in regard to the right to use the trade name "Copper Clad," which is expected to go to a hearing in the early fall.

Export of American Motor Trucks.

A recent government report states that 84 commercial motor vehicles, valued at $134,777, were exported by American manufacturers during April last, and 737, valued at $1,333,367, were exported during the ten months ending with April. It is only since July 1, 1912, that the government has kept a separate record of commercial motor vehicles, the records prior to that time having only included pleasure cars.

While the figures show that the export business of American motor truck manufacturers is very small in comparison with the total export of motor vehicles from this country, they nevertheless indicate that the American motor truck has already secured a strong foothold in foreign countries and the next few years will unquestionably show as rapid an increase in their use in other countries as has been the case with the American-made pleasure car.

The Chase Motor Truck Co. of Syracuse, N. Y., is one of the large American manufacturers that is meeting with success in the foreign field. Robert M. Barker, of this company, is quoted as follows:

"The American motor truck is now being used in every corner of the world. One day last week we received orders by cable and mail from Hong Kong, China; Melbourne, Australia; Auckland, New Zealand; Barranquilla, United States of Colombia, and from Havana, Cuba. The Hong Kong order was for a five hundred pound wagon. It was sent by an American missionary, the Rev. Mr. J. M. Monnier, whose title is Imprinierie de Nazareth. He said he wanted this motor wagon for use on his trips, which last two or three weeks, and on which he had occasion to carry medical supplies as well as a complete camping outfit.

"The Barranquilla order came from the owner of a banana plantation situated fifty miles inland. This man has been transporting his fruit from the plantation to Barranquilla by mules, which took an entire week for a single round trip. He figures that the one and a half ton Chase truck he has ordered will make the round trip in at least one and a half days and effect a great saving in the cost of this transportation.

"Our Mr. D. R. Linsley, who has been gone some time on a trip to the West Indies, Central and South America, reports that conditions are ideal in the tropics for an extensive introduction of American made motor trucks. English, French and German manufacturers have been established for some time in these countries, but the American maker has an advantage over them in the matter of price and, in our case at least, in the matter of simplicity in design and construction. We use a two-cycle air-cooled motor which performs as well in the tropics as it does here."

Paragraphs.

Oshkosh Mfg. Co., Oshkosh, Wis., announces that owing to constantly increasing business and lack of space in the old quarters, the company has found it necessary to remove its Chicago office in charge of R. L. Thayer, from 424 S. Clinton street to 419 S. Clinton street.

Legal Cases and Decisions

By A. H. McMillan

Finding Legal References.

"Where could we get a copy of Nebraska Telephone Co. vs. York Gas & Electric Light Co.? What does 27 Nebraska, 284, mean? Where could we obtain American Electrical Cases, 346? These references are from TELEPHONY of March 8, page 58.

In TELEPHONY, April 5, page 60, it is stated: "The railway company is not liable for injury to the lines of the telephone company on the same streets, due to induction or conduction." In this decison our interpretation is that the electric company is liable for any charge or damages caused by having to rebuild telephone lines to get away from induction. The quotation, to our way of thinking, seems to be against the telephone company. We will appreciate any suggestions. Reference is also made to the McCluer device. Please advise what this device is and who is its manufacturer?

In TELEPHONY, May 24, 1913, page 59, is this statement: "Where a telephone company can avoid induction by this means, it is its duty to do so." Please advise whose expense bill this will be. Where can we get a copy of the decision of Rocky Mountain Bell Telephone Co. vs. Salt Lake Railway Co., 3 American Electrical Cases, 356.

Will you please advise where we can get copy of 65 Northeastern 329? Also where we can get Joyce on Electric Law and McMillan on Telephone Law?"

To obtain copies of the cases cited, we refer you to your local attorney. He will either have them in his office or know where you can get them. They could be found in any state law library. The same is true of Joyce's work on "Electric Law." McMillan on "Telephone Law" can be obtained through TELEPHONY. For a full account of McCluer's device read the case of Citizens Telephone Co. vs. Fort Wayne & Southern Railway Co., 100 Northeastern, 311.

The proposition you quote from TELEPHONY, "The railway company is not liable for injury to the lines of the telephone company on the same streets, due to induction or conduction" is somewhat against the telephone company, but the proposition must be understood as applying only to the case in which it was decided.

You quote from section 139 of McMillian on "Telephone Law" and ask at whose expense the work is to be done. It would be at the expense of the party responsible, in this case the electric company.

Exchanging Calls Free.

"I am operating an exchange and have connections with three other boards, two of which agreed to exchange calls for our subscribers without charge; the other one, having six miles of toll line into my office, would not agree to give an even "swap-out" and compels me to pay 25 cents per month for each of my box rent customers. I handle his toll calls on a 10 per cent. commission.

I wish to know if it is just and right for me to pay 25 cents per month for my customers and take calls from subscribers of that exchange free. You understand that I have no toll line, and handle the toll business over his line on a basis of 10 per cent. commission. Furthermore, I wish to know if it is the practice where one has no toll line, to set up, free of charge, connection between two toll lines."

It is not just for the party in question to make you pay him 25 cents per month for each of your box rent customers and require you to take his customers free. To even matters up we advise you to retaliate by compelling him to pay you an equal compensation. It is not the practice where there are no toll lines to establish connection between two toll lines free of charge.

Trimming Trees in Iowa City.

"Will you please quote references and state what rights wire companies have in Iowa as regards trimming trees, both in cities and also along public highways. A few years ago the legislature of this state enacted a law which prohibited continuous rows of trees or hedges, over six feet in height along public highways. Please furnish the references for this also as it would help out the trimming question considerably."

Telephone companies in the state of Iowa have the right to trim trees reasonably, so long as they do not go beyond what is necessary in the prosecution of the work of construction. This is true in cities. In the country such companies have the right to cut away obstructing tree branches, to admit of the free passages of wires, but will be answerable for any unnecessary, improper, or excessive cutting. McMillan on "Telephone Law," Sections 171, 172.

We have not the reference to the statute you quote, prohibiting any existence of continuous rows of trees or hedges over six feet high along public highways and must refer you to the public acts of your state.

Changing Service.

Persons living in Jefferson county, Colorado, just over the line dividing that county from the city and county of Denver, made contracts with the Colorado Telephone Co. for service. Such contracts were subject to termination at the option of either party upon 30 days' written notice. When these contracts were made, only a few people were located in the neighborhood. Afterwards the community grew in population so that the number of residents who wished telephone service increased, and it became necessary for the telephone company to establish an exchange at Arvada, three or four miles to the northwest.

After the new exchange was established, notice was given to the subscribers that their contracts would be terminated at the expiration of 30 days, when they could, if they desired, make other contracts for service through the Arvada exchange, at the same rate and with the like facilities as that furnished to other subscribers of the Arvada exchange. Upon receiving this notice the subscribers in question brought a common suit to enjoin the telephone company from exercising its option under these contracts to terminate them and to compel the company to continue to furnish service as before. It appeared that geographically the subscribers were in a territory immediately tributary to Denver and could be more readily connected with the Denver system than with the Arvada exchange.

The court held that while the specific contracts under which service had been furnished could be lawfully terminated, on compliance with the conditions as to notice, service could not be terminated by the company at will, or the character or quality changed so as to make it inferior to, and more expensive than that furnished to other users similarly situated in the telephone zone of the city, so long as the subscribers were ready to receive and pay for it on the same terms and conditions as others in that territory. Colorado Telephone Co. vs. Wilmore, 129 Pacific, 204.

Time Defective Wires Were in Position Immaterial.

If an accident occurred by reason of improperly insulated electric wires hanging over a street, it is immaterial to the electric company's liability whether they hung there for a short or for a long time, the negligence not consisting of the length of time they hung over the street. In such a case the presence of the wire is a presumption of negligence, placing the burden on the electric company to free itself from the effect of such presumption. It is the duty of an electric company, which maintains small wires suspended above highly charged electric wires, to have the small wires perfectly insulated, so that, should they fall upon the other wires so as to receive a sufficient charge of electricity as to make them dangerous to life, injury would not result.

The proximate cause of the accident in such a case where a defectively insulated wire fell upon a large power wire and hung over the street charged with electricity from the power wire, was the falling of the uninsulated wire upon the power wire, since the accident would not have occurred without it. If an electric wire is in such a condition that it would break in the absence of storm or unusual force, the electric company was chargeable with knowledge that it might break and that its insulation was defective. Shirley vs. Southwestern Telegraph & Telephone Co., 155 Southwestern, 663.

Condensed News Reports

Officers of Companies are Earnestly Requested to Forward Us Promptly All Financial and Other Statements as Soon as Issued, and Any Items of Interest as to Their Plants and Systems

Personal.

FRED CHILDERS, formerly of Iowa Park, Texas, has been appointed manager of the Southwestern telephone system at Henrietta, Texas, succeeding John K. Sweet, resigned .

JOHN E. CHAMBERS, Carlisle, Ky., who has been manager of the Nicholas Home Telephone Co. for several years, has been appointed manager of the Home company's office and plant in Frankfort. Mr. Chambers will be succeeded at Carlisle by W. G. Corman, of Mayfield.

New Companies and New Incorporations.

HARRISON, ARK.—The Boone County Telephone Co. has voted to incorporate with a capital stock of $25,000. The company will take over the interests of the Southwestern Telegraph & Telephone Co. in Boone county.

EUBANK, KY.—The Eubank Telephone Co. has been organized with a capital stock of $1,000.

BERTHA, MINN.—Articles of incorporation have been filed by the Bertha Southwestern Rural Telephone Co. The officers are: A. Leseman, Bertha, president; Chas. Current, Eagle Bend, secretary, and A. Weiher, Bertha, treasurer.

HILL CITY, MINN.—The Hill City Telephone Co. has been incorporated with $10,000 capital stock. The officers are: B. E. Wideman, Pine River, president; E. L. Forbes, Pine River, vice-president; and F. E. Sprout, Hill City, secretary and treasurer.

BELGRADE, MONT.—The Dry Creek Telephone Co. has been incorporated with $2,100 capital stock. The incorporators are: William I. Brownell, Wesley Davis and James M. Moore.

WESTFIELD, N. D.—Articles of incorporation have been filed by the Overland Telephone Co. with a capital stock of $10,000. The incorporators are: Peter Borr and Andrew Olson, of Pollock, S. D., and Gerrit Van Beek, Westfield, N. D.

PUTNAM STATION, N. Y.—Articles of incorporation have been filed by the Putnam Telephone Co. The incorporators are: J. A. McLaughlin, Henry L. Roberts, and G. E. Dedrick. The capital stock is $5,000.

MCCONNELLSVILLE, OHIO.—The Young Hickory Telephone Co. has been incorporated by Clyde Leeper and Frank B. Smith, both of this city. The capital stock is $15,000.

ASHER, OKLA.—The Rival Telephone Co. has been organized with the following officers: President, J. M. Farley; treasurer, Ed Archer; secretary, C. V. Rice; trustees, A. N. Fugate, J. L. Garrett and J. G. Hibbard.

ODELL, OKLA.—Articles of incorporation have been filed by the Odell Rural Telephone Co. with $500 capital stock. The incorporators are: W. H. Honey, J. F. Gilbert, Geo. Lee and Grant Flinn, of Wanette, and Frank McCall and J. R. Williams, of Trousdale.

OKLAHOMA CITY, OKLA.—A charter has been issued to the Adell Rural Telephone Co. The incorporators are: W. H. Haney, J. F. Gilbert, George Lee and Grant Flynn of Wantee, Frank McCall and J. R. Williams of Trousdale. The capital stock is $500.

CLEVELAND, ORE.—The Cleveland & Coles Valley Telephone Co. has been incorporated with $2,000 capital stock. The incorporators are: A. E. Clayton, W. R. Vinson, and John Krohm.

MECHANICSVILLE, PA.—The Mechanicsville Rural Telephone Co. has been organized to build lines in this vicinity. The following officers were elected: President, John Loux; vice-president, Frank Pursel; secretary, A. L. Slotter; treasurer. Harry Vasey. The other members of the company are: Daniel K. Grim, Walter W. Kessler, Frank H. Rice, E. L. Thompson, and F. A. Rich.

YALE, S. D.—The Winthrop Telephone Co. has been incorporated with $1,200 capital stock. The incorporators are: J. J. K. Techetter, J. J. Decker and Kach Kleinsasser, all of Carpenter, S. D.

BAGDAD, VA.—Articles of incorporation have been filed by the Campbell Terrell Telephone Co. with $5,000 capital stock. The officers are as follows: President, J. P. Campbell, of Bagdad; secretary and treasurer, Mrs. J. P. Campbell of Bagdad; vice-president and general manager, J. T. Terrell, of Doswell. The officers together with W. L. Terrell and Mrs. W. L. Terrell, of Doswell, constitute the board of directors.

MENLO, WASH.—A meeting was held here, to organize the Willapa Valley Telephone Co. to connect with the Willapa Harbor Telephone Co. of Raymond, Wash. A new line costing approximately $4,000 will be built.

SOLDIERS GROVE, WIS.—The Soldiers Grove Farmers Telephone Co. has been organized by E. T. Johnson, G. E. Anderson and George Henthorn, all of Soldiers Grove.

WHEELING, W. VA.—The Consolidated Telephone Co. of West Virginia has been incorporated with $500,000 capital stock. The incorporators are: J. L. Dickey, S. W. Harper, W. C. Handlan, R. C. Dalzell and H. S. Sands, all of Wheeling.

WHEELING, W. VA.—Articles of incorporation have also been filed by the Consolidated Telephone Co. of Ohio with $500,000 capital stock. The company has the same incorporators as the one previously mentioned.

Construction.

ST. PETERSBURG, FLA.—The West Coast Telephone Co. has purchased a site and will erect a two-story modern exchange building.

KEWANEE, ILL.—The board of directors of the Kewanee Home Telephone Co. has voted to expend $6,000 for switchboard, cable and pole improvements and $2,000 for instruments.

INDIANAPOLIS, IND.—Plans are being completed for a new fireproof telephone exchange building for the Indianapolis Telephone Co.

BRINSMADE, N. D.—At a recent meeting of the Brinsmade Telephone Co., it was decided to build a metallic line to Harlow.

MUNCY, PA.—At a recent meeting of the West Branch Bell Telephone Co. it was decided to extend the line from Allenwood river bridge to Elimsport and from Elimsport to Montgomery, with the necessary side lines to accommodate new subscribers.

KIMBALL, S. D.—The Brule County Telephone Co. is planning to install approximately 8,000 feet of cable and changing the system to metallic.

CLEBURNE, TEXAS.—The Southwestern Telegraph & Telephone Co. will erect a new exchange building, to cost approximately $21,000.

Elections.

VERMONT, ILL.—The stockholders of the Vermont Telephone & Exchange Co., which was recently incorporated, held a meeting and elected the following officers and directors for the ensuing year: President, O. H. Russell; secretary-treasurer, G. C. Foster; directors, Fred Rankin, D. O'Connell, Walter Wayne, Glenn Marshall, B. G. Mershon and P. R. Johnston.

WOODSTOCK, ILL.—At the annual meeting of the Woodstock Telephone Co., held recently, the following officers and directors were elected for the ensuing year: President, H. E. Luce, secretary and treasurer, S. R. Kelly; directors, T. B. Wood, G. O. Blood, C. M. White, L. W. English, G. W. Shaw, H. E. Luce and S. R. Kelly. The company contemplates extending its lines to Windsor, Ill.

WISNER, NEB.—At the annual meeting of the Cuming County Independent Telephone Co., the following officers and directors were elected: President, B. H. Von Seggerns; vice-president, O. R. Thompson; secretary, George Lehmkuhl; treasurer, Harry E. Leisy; manager, John W. Raymond; directors, George Lehmkuhl, G. H. Schutte and H. C. Gralheer.

Miscellaneous.

ALTON, ILL.—The Kinloch Telephone Co. will install a flashlight and telephone and police fire alarm signal system in this

OIL CITY, PA.—At a meeting of the directors of the Petroleum Telephone Co., a semi-annual dividend of 3½ per cent. was declared.

JANESVILLE, WIS.—The plans are being made for a $40,000 building for the Rock County Telephone Co.